SECTION 21

ST. LOUIS COUNTY RECREATION PLAN
FOR THE CLOQUET, ST. LOUIS AND WHITEFACE RIVER CORRIDORS

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EXECUTIVE SUMMARY

Locally generated management plans are an accepted but uncommon approach to protecting natural resources in Minnesota. Several successful local management plans have been developed for Northeastern Minnesota rivers, such as the Upper Mississippi River, Big Fork River, and Rainy and Rapid Rivers, using similar boards and citizen groups. None of the previous plans, however, have had the caliber of protection set forth in this plan for the St. Louis, Cloquet, and Whiteface Rivers and streams managed for trout.

This locally generated management plan provides adequate protection to the rivers' ecosystems in the areas of land use, forestry management, and land acquisition. Once implemented into local zoning or land use ordinances, the recommendations contained in the St. Louis River Management Plan will result in increased lot sizes, a no-cut zone along the river corridor, mandated forestry management plans, and public purchase of 22,000 acres of river front land.

In addition, this management plan for the St. Louis, Cloquet and Whiteface Rivers examines some issues of concern and educates the reader in the areas of water quality, recreation, archeology, and history in the watershed. Current issues of concern, such as in-stream flow management, erosion, sedimentation, and mercury deposition, have played a role in examining the health of the St. Louis River system during the planning process. These issues, however, could not be adequately addressed in the context of this management plan. It is expected that these issues will continue to be discussed and examined by the St. Louis River Board as well as other entities in the watershed.

It is not overlooked that this management plan will have economic impacts. The dimensional standards recommended in this plan may hinder some development in certain areas and may not allow individuals to subdivide land holdings. The forest management zones and guidelines will effect the timber harvesting along the rivers and managed trout streams. The required forest management plans will be a source of additional work for some individuals. The land that will be acquired will also have an effect on the tax base of the county. These economic impacts were an important consideration during the development and public hearing phase of the plan.

Members of the St. Louis River Board recognize and acknowledge the face that families live, work, and recreate along these rivers. The St. Louis River Board, however, believes that the benefits gained in limiting development, managing timber harvests, and purchasing land for public use outweigh the economic impacts of this generation and will be a benefit to future generations.

INTRODUCTION

Throughout time, the St. Louis River and its two major tributaries have been important to life in the Arrowhead Region of Minnesota. At first, its resources sustained the Native American settlements along the river banks. Then its currents floated an abundance of animal pelts and timber of markets for early explorers and loggers. Now, its flow supplies electricity and recreational opportunities to the region's people. As the needs and its inhabitants change, so do the uses and demands upon the river and resources.

The Rivers

The St. Louis with its two major tributaries, the Cloquet and Whiteface Rivers, is one of the largest and most diversified river systems in Minnesota. The combined river routes, over 350 miles in length, encompass three counties. The watershed drains approximately 3,500 square miles in five counties. The headwaters of all three rivers are largely unspoiled with development ranging from sparse to nonexistent. As the rivers flow downstream, small individual cabins begin to appear on the banks of all three rivers. Later consolidated areas or small communities, such a Floodwood and Cotton, exist along the rivers. Still further downstream, greater influences such as several hydroelectric dams, paper mills, and the cities of Cloquet and Duluth exist on the river.

The St. Louis River flows over 175 miles and has a total drop in elevation of 1,100 feet from its source at Seven Beaver Lake, near Minnesota's Iron Range, to its mouth at Lake Superior. The river flows mostly through St. Louis County, with the lower stretch in Carlton County. The St. Louis is remote in character throughout much of the upper reaches and is a relatively quiet river, until it reaches Highway 2 where numerous rapids appear, some quite spectacular.

The Cloquet River flows for 99 miles from Cloquet Lake in Lake County to its confluence with the St. Louis River in St. Louis county. the upper reaches of the Cloquet River are primarily remote. The water levels on the lower reaches of the river are heavily regulated by the Island Lake Reservoir. The Cloquet is a wild river with numerous rapids and short falls with long deep pools through its route.

The Whiteface River flows for 80 miles and drops 430 feet from its beginnings at the Whiteface Reservoir to its confluence with the St. Louis River. The river and its level is controlled by the Whiteface Reservoir. The Whiteface River is relatively unspoiled in character and approximately doubles the size of the St. Louis River at its confluence upstream from the City of Floodwood.

Intro Map

THE PLANNING PROCESS

The residents along the St. Louis, Cloquet, and Whiteface Rivers recognize the value of rivers to our quality of life, commerce, and industry. In recent years, pressure has increased on all three rivers as people seek areas with unspoiled shoreland for new permanent and second homes within a reasonable distance from urbanized areas. Most lakes in Carlton and southern St. Louis county already have heavy development along the shoreland. The lower reaches of the St. Louis and Cloquet Rivers are particularly susceptible to such development because they are in close proximity to Duluth-superior and a short three hour drive from the Minneapolis/St. Paul metro area.

The need to take immediate action to protect the rivers from large-scale development became necessary when plans by Minnesota Power, a large electric company in Northeastern Minnesota, decided to sell much of its riparian land holdings which had been purchased to ensure water levels for its hydroelectric dams. Much of Minnesota Power's land holdings have remained undeveloped and open for public use. With the increasing demand for shoreland development, the St. Louis County Planning Commission was asked in 1990 to approve a subdivision proposal on riparian land south of Brookston, Minnesota. The proposal quickly raised concerns in the surrounding townships and Fond du Lac Reservation.

Potential adverse impacts to wildlife and the loss and degradation of existing wildlife habitat could have been significant. In addition, the proposal either included or would have been situated adjacent to ecologically sensitive wetlands and in a designated flood plain. Potential degradation of the water quality of the St. Louis River due to the increased erosion and run-off from the developed parcels was also a significant threat. The proposal also raised concerns about similar future proposals throughout the lower reaches of the rivers and the ability of the townships to regulate, manage, and provide utilities for the increased development.

A collective effort by citizens from Brevator, Culver, and Stoney Brook Townships and from the Fond du Lac Reservation, in cooperation from Minnesota Power, resulted in a temporary halt to development. In the fall of 1990, an agreement was reached to form an organizational steering committee to determine the feasibility of a management plan for the rivers. This committee recommended the formation of a joint powers board and held public meetings in April 1991 to hear public concerns.

Over 200 concerned citizens attended and voiced the need for balance in the planning process, allowance for reasonable development, protection of the scenic beauty, and outright public ownership or purchase of various sections of the rivers. Concern was also expressed regarding the potential sale of lands owned by Minnesota Power.

In addition, public sentiment called for a locally developed plan. Fifteen years ago, the Minnesota Department of Natural Resources attempted to propose a Wild and Scenic plan for both the St. Louis and Cloquet Rivers. Even though attempts were made to seek public input, the effort failed because it was viewed as state government interfering in local affairs. In more recent years, the Minnesota

Department of Natural Resources revised its Statewide Shoreland Standards. These standards provided for the implementation of local controls that deviate from the state standards if they are tailored to the unique local problems and resource conditions. this provided the opportunity for a locally developed plan.

The St. Louis River Board (SLRB) was formally established as a Joint Powers Board in March of 1991. The membership of the Board includes elected officials appointed by each member county and township in accordance with the following distribution: Lake County (one member and one alternate), St. Louis County (three members and three alternates), and Carlton County (two members and two alternates); Townships in the watershed (six representatives and six alternates representing 53 affected townships); and Fond du Lac Reservation Business Committee (one member and one alternate).

The purpose of the SLRB is to formulate a comprehensive management plan for the environmental protection and wise use of the St. Louis, Cloquet, and Whiteface Rivers, and adjacent lands form their headwaters to the Fond du lac Dam in St. Louis County. The management responsibility is jointly shared by the counties, townships, cities and the Fond du Lac Reservation exercising land use control and jurisdictions within the river corridor.

A 26 member Citizens Advisory Committee (C.A.C.), representing a broad base of local interests in the corridor, provides citizen recommendations to the Board, ensures representation of all potentially affected individuals, and encourages and facilitates public involvement. The C.A.C. also sponsored public meetings and developed the specific provisions of this management plan. The interest areas represented on the C.A.C. are as follows: Logging, environment, development, tourism, agriculture, recreation, sport groups, property owners, industry, Fond du lac Reservation, and others.

Representatives from local, state, federal and tribal land management and regulatory agencies also serve as technical assistant contracts providing information and technical expertise to the Board and Citizen Advisory Committee. See appendix for a complete list of technical assistant contacts.

The Process

The planning effort was initiated in the fall of 1991 with the appointment of the C.A.C. and numerous public meetings in the watershed. The major issues identified at these meetings included: land use management (lot sizes, setback, erosion, agriculture and forestry practices), fish and wildlife (habitat protection), water quality (sedimentation, toxics and contamination), recreation (canoe areas,campsites, hunting and fishing use), and archeological and cultural areas (identification and protection).

By the spring of 1992, the Citizens Advisory committee started to examine the existing character of each of the rivers using technical expertise, educational presentations, topographic maps, land use data, and ownership maps. After the C.A.C. had examined each of the rivers, they conducted a public meeting to review their findings and gather additional information from the public. Through this process, segments of the rivers were classified into one of five possible designations (Primitive, Remote,

Rural/Agricultural, Recreational and Urban) based on the existing character of the river. This classification of the rivers forms the cornerstone of the management plan to maintain the rivers' character.

LAND USE

The local units of government represented by the St. Louis River Board currently administer zoning ordinances of land use plans for their respective jurisdictions. The St. Louis River Management Plan recognizes the authority of local units of government to administer this plan through zoning ordinances or land use plans. The river classifications and land use policies contained in this plan are intended to guide local plan implementation and shoreland decision making within the planning corridor denoted.

The local units of government will continue to carry out specific land use responsibilities in accordance to Minnesota Statutes, including but not limited to the issuance of permits, conditional uses, variances, and the designation of land use districts. Local ordinances and/or performance standards will be revised to further the purpose and objectives of this plan and be consistent with the St. Louis County Water Plan. All levels of government or jurisdictions and their agencies, shall adhere by this plan which was developed by an open process and through collaborative efforts over an extended period of time.

The river classifications are as follows: Primitive, Remote, Rural/Agricultural, Recreational, Urban, and Unique Protection Areas. The boundaries of the river classifications are suggested in order that land use classifications will be established by each local unit of government.

The principles and policies of this plan are also intended to guide state and federal management to the same degree as private individual's actions to promote the protection, preservation, and proper and orderly management of the St. Louis, Cloquet, and Whiteface Rivers and their adjacent shoreland environments.

Land Use Objectives

The land use objectives used in developing the St. Louis River Management Plan were as follows:

1. **Public Participation.** Ensure a forum for the public to provide input to government officials regarding development and protection of the St. Louis, Cloquet, and Whiteface Rivers through the utilization of a Citizen Advisory committee to advise the Board.

2. **Local Control.** Provide for local control and management in partnership with all governmental bodies.

3. **Effective Management.** Evaluate the adequacy of current land use standards and land use management practices to protect sensitive land and water resources and recommend appropriate amendments, deletions or additions.

4. **Reasonable Use.** Allow land use consistent with the natural characteristics of the land and river, protect existing personal property rights, promote sensible economic development, and assure continued access to the river by residents and visitors alike.

5. **Land Acquisition.** Develop criteria which will result in the identification and recommendation for public purchase, from voluntary and willing sellers, of undeveloped, sensitive riparian lands offering very high quality scenic, natural, recreational, historical, scientific, ecological, and archaeological resource values requiring greater protection.

Land Use Principles

The following concepts are intended to be followed so that each river class will be managed to protect and enhance the values for which each segment was designated, while providing for the protection of private property rights, and the public's interest in the river and its adjacent shoreland environments.

! Public use will be managed where necessary to protect and enhance the natural resource values of the designated river segment.

! Allowable land uses and land use controls will be consistent with the resource values of the river class; the level of control and restrictions vary from primitive (most restrictive), to urban, (least restrictive).

! Through implementation, the county, city, and township exercising land use authority will regulate which land uses will be prohibited or permitted consistent with the management goals for each river classification and the land use examples contained in this plan.

! Shoreland development will be prohibited in areas subject to flooding and highly discouraged in areas that would contribute to flooding, erosion or sedimentation.

! Shoreline development will be prohibited on steep slopes where such development would increase the likelihood of erosion or impairment of scenic values.

! Shoreland development will be prohibited in the shore and bluff impact zones.

! Wetland areas will be protected through local ordinances that are consistent with state wetland laws and regulations.

! All subdivision plats, conditional uses, and variances within the designated river corridors will be reviewed by the appropriate review authority for the opportunity to comment on potential impacts to the rivers' resources.

! Designated or proposed Scientific and Natural Areas (SNA) by the Department of Natural Resources or County Natural Areas will be protected. New SNA will also be identified and protected.

! Shoreland development will not significantly impair natural ecosystem functions. Land uses should be determined and base primarily by the suitability of the land and availability of public services.

River Classification Areas

The river classification areas were determined by systematic observations by the Citizens Advisory Committee of the rivers' current character. Very concrete categories of river attributes were examined, including generalized land use, sensitive or problem areas, ownership, land use, impoundments, and shoreline development. Once the current character of all the river reach was determined, the C.A.C. matched the character to the classification criteria and determined an appropriate management goal, evaluated the current management, and developed dimensional standards. This information was then presented at a series of public information meetings during 1992 to get the public's input and agreement on the proposed river classifications and areas.

During the systematic observations, a one mile planning area on each side of the river was examined by the committee. After the appropriate management goal was determined, however, the C.A.C. decided to decrease the planning area to the distances shown below. It was felt this would allow an adequate buffer to be maintained for protection of the rivers' ecosystems.

Primitive	1/2 mile
Remote	1/4 mile
Rural/Agricultural	1/4 mile
Recreational	1/4 mile
Urban	300 feet

Unique Protection Areas

A. Unique Protection Areas Definition

Unique Protection Areas (UPA) are identifiable areas of unique cultural, archaeological, historical, geologic, scientific, natural, ecologic, or scenic significance worthy of protection or preservation. The intrinsic values these areas contain are of vital importance to the character of the river systems. Such areas may be located in any river class or area. These areas need to be inventoried, identified as unique protection areas, and protected through appropriate means since this type of intrinsic value is impossible to replace.

Currently inadequate information is available to determine unique protection areas within the rivers' system. The County Biological Survey, however, will be an important step in identifying areas worthy of protection. The biological survey work for the St. Louis River corridor should be placed as a high priority.

B. Unique Protection Areas Management Goal

Manage Unique Protection Areas to protect the intrinsic values that contribute to the rivers' character.

C. **Effective Management**

Unique Protection Areas will be managed by appropriate protection measures as determined by the St. Louis River Board.

River Classification Maps

The maps that follow provide a graphic depiction of the river classifications that are described on each adjacent page. The maps are to be used as a general guide by local zoning authorities to use in adopting, amending, and administering local zoning ordinances to be consistent with the goals and policies of this plan. These maps are not zoning maps and do not establish zoning district boundaries. It remains the responsibility of local legislative bodies to create zoning ordinances based on goals and policies set forth in this plan, including specific zoning district boundaries and maps.

PRIMITIVE AREAS

A. Primitive Area Definition:

Primitive Areas lie adjacent and within one-half mile of each side of the river. Primitive areas are defined as those areas which generally have the following characteristics: minimal evidence of human impact, heavily wooded or forested, undeveloped, and essentially roadless with shoreline in a pristine, natural state.

B. Primitive Area Management Goal

Manage primitive areas to protect and maintain the natural character of the river and its adjacent shoreland environment, including its scenic beauty, soils, vegetation, geology, fish and wildlife habitat. Only land uses which are compatible with this goal will be allowed in primitive areas.

C. Effective Management

In evaluating the adequacy of current zoning standards and land use management practices to protect and preserve the natural character of primitive areas, it was found that a new land district needs to be established in St. Louis County which would adequately curtail development and preserve the natural state in primitive areas. Land uses appear on page 21.

D. Dimension Standards:

Lot size:	35 acres
Lot frontage:	1200 feet
Structure setback:	300 feet
Shore impact zone:	150 feet
Sanitary Setback:	250 feet

There are approximately 32.5 miles of river in the Primitive River Classification.

Primitive Areas Map

REMOTE AREAS

A. Remote Area Definition:

Remote Areas are defined as those lands lying within one-quarter mile on each side of the river. Remote areas generally have the following characteristics: some human impact is noticeable from the river, multiple use forestry practices are evident in the corridor, river front lands are largely undeveloped, corridor and river front lands are partially accessible by trails, paved and non-paved roads, or bridges, overall shoreline use is of relatively low intensity, and overall the shoreline is in a mostly natural state.

B. Remote Area Management Goal

Manage remote areas to protect and maintain the existing natural, undeveloped state of the river and its adjacent shoreland environment. Only land uses which are compatible with this goal will be allowed in remote areas.

C. Effective Management

In evaluating the adequacy of current zoning standards and land use management practices to protect the existing character of the river and adjacent shoreland uses while meeting the management goal of a remote area, it was found that the Forest Agricultural Management district (FAM) of the St. Louis County Zoning Ordinance No. 46 would be adequate. The counties of Carlton and Lake will establish similar land use districts or use existing land use districts which are consistent with management goal and dimensional standards outlined for the Remote river classification areas. Land uses appear on page 21.

D. Dimension Standards:

Lot size:	17 acres
Lot width/frontage:	600 feet
Structure setback:	200 feet
Shore impact zone:	150 feet
Sanitary Setback:	150 feet

There are approximately 153 miles of river in the Remote Classification.

Remote Areas Map

RURAL/AGRICULTURAL AREAS

A. Rural/Agricultural Area Definition

Rural/Agricultural Areas are defined as those lands lying within one-quarter mile of each side of the river. Rural/Agricultural areas generally have the following characteristics: forested riparian strips with a mixture of cultivated fields, pasture, or forested land beyond the immediate shoreline; some seasonal and year-around residential uses; land is suitable for additional residential development and/or recreational use and is readily accessible by road; impoundments or diversion works exist in the river channel; and there is overall low recreational use of the river.

B. Rural/Agricultural Area Management Goal

Manage Rural/Agricultural Areas in the following two ways to protect the existing character of the river and adjacent shoreland uses: (1) maintain suitable land for agricultural uses and encourage continuation of agricultural pursuits and (2) allow for limited shoreland development that does not adversely impact or detract from the predominant agricultural character of the area. Only land uses which are compatible with this goal will be allowed in Rural/Agricultural Areas.

C. Effective Management

In evaluating the adequacy of current land use standards and land use management practices to protect the existing character of the river and adjacent shoreland uses while meeting the management goal of a Rural/Agricultural area, it was found that the Forest Agricultural Management district (FAM) of the St. Louis County Zoning Ordinance Nol 46 would be adequate. Land uses appear on page 21.

D. Dimensional Standards:

Lot size:	9 acres
Lot width/frontage:	600 feet
Structure setback:	200 feet
Shore impact zone:	150 feet
Sanitary Setback:	150 feet

In the Floodwood area smaller lot sizes than required for the agricultural areas may be permitted on nonriparian lands within the corridor if soil conditions and floodplain limits permit.

There are approximately 107 miles of river in the Rural/Agricultural Classification.

Rural/Agricultural Areas Map

RECREATIONAL AREAS

A. Recreational Area Definition
Recreational Areas are defined as those lands lying within one-quarter mile of each side of the river. Recreational areas generally have the following characteristics: shoreline is mostly in a natural state with some human impact evident from within the one-quarter mile corridor; area is readily accessible by the public; roads, bridges, and railroad grades are visible from the river, some seasonal and/or permanent development is visible from the river. The river may be impounded. The river is used moderately or heavily for public and private recreational purposes.

B. Recreational Area Management Goal
Manage Recreational Areas to protect the existing character of the river adjacent to shoreland environments, protect and enhance the existing public and private recreational uses prevalent in the reach, allow for continued, but controlled public access and develop historical, cultural, archeological, scientific and environmental interpretive and/or education opportunities in these areas. Only land uses which are compatible with this goal will be allowed in Recreational Areas.

C. Effective Management
In evaluating the adequacy of current zoning standards and land use management practices to protect the existing character of the river and adjacent shoreland uses while meeting the management goal of a recreational area, it was found that the Multiple Use Non Shoreland (MUNS) district of the St. Louis County Zoning Ordinance No. 46 would be adequate. The Counties of Carlton and Lake will establish similar land use districts or use existing land use districts which are consistent with management goal and dimensional standards outlined for the Rural/Agricultural river classification areas. Land uses appear on page 21.

D. Dimensional Standards:

Lot size:	4.5 acres
Lot width/frontage:	300 feet
Structure setback:	150 feet
Shore impact zone:	75 feet
Sanitary Setback:	150 feet

There are approximately 28 miles of river in the Recreational classification.

Recreational Areas Map

URBAN AREAS

A. Urban Area Definition

Urban Areas are defined as those lands lying within 300 feet on each side of the river and generally have the following characteristics: river front is developed for municipal land uses such as residential, commercial, industrial, parks; areas are very accessible by road and railroads; areas contain industrial sites, railroad yards, structures, parking lots and these are visible from the river, and river reaches in Urban Areas may have impoundments or diversion works.

B. Urban Area Management Goal

Manage Urban Areas to provide for continuation of existing shoreland uses, to protect public and private investment, to ensure that new or expanded urban use is compatible with and protective of existing environmental attributes of the river, and to protect existing open space and wetland areas.

C. Effective Management

In evaluating the adequacy of current zoning standards and land use management practices to provide for continuation of existing shoreland uses, it was found that for most urban areas in the river corridor the floodplain management standards are adequate. Land uses appear on page 21. A one mile distance beyond the current city limits or to the nearest jurisdictional boundary has been prescribed for the urban areas shown on page 20. It is felt that this will allow for the gradual growth of these urban areas. The urbanized areas do retain the right of annexation to expand the boundaries of the city.

D. Dimensional Standards:

Lot Size:	2.5 acres for public sewered areas and for unsewered areas
Lot width/frontage:	200 feet
Structure setback:	100 feet
Shore impact zone:	75 feet
Sanitary Setback:	75 feet

There are approximately 8 miles of river in the Urban classification.

Urban Areas Map

Land Use Regulations by River Classification Chart

DEVELOPMENT STANDARDS

A. **High Water Elevations.** Structures must be placed in accordance with any floodplain regulations applicable to the site. Where these controls do not exist, the elevation to which the lowest floor, including a basement, is placed or flood-proofed must be determined by placing the lowest floor at least three feet above the flood of record.

If data is not available, a technical evaluation must be conducted to establish a flood protection elevation of the proposed construction at flood stages and flood flows. Under both approaches, technical evaluations must be done by a qualified engineer or hydrologist consistent with Minnesota Rules, parts 6120.5000 to 6120.6200 governing the management of flood plain areas. If more than one approach is used, the highest flood protection elevation determined must be used for placing structures and other facilities.

Water-oriented accessory structures may have the lowest flood placed lower than the elevation determined in this item if the structure is constructed of flood-resistant materials to the elevation, electrical and mechanical equipment is placed above the elevation and, if long duration flooding is anticipated, the structure is built to withstand ice action and wind-driven waves and debris.

B. **Water-oriented Accessory Structures.** Structures, such as saunas, gazebos, screen houses, fish cleaning houses, are not allowed in Primitive and Remote river classifications. In Recreational, Rural/Agriculture, and Urban river classifications, each lot may have one water-oriented accessory structure not meeting the normal structure setback of the river classification if this water-oriented accessory structure complies with the following provisions:

(1) the structure of facility must not exceed 12 feet in height, and cannot occupy an area greater than 200 square feet. Detached decks must not exceed 12 feet in height;

(2) the setback of the structure or facility from the ordinary high water level must be at least 30 feet;

(3) the structure or facility must be treated to reduce visibility as viewed from public waters and adjacent shorelands by vegetation, topography, increased setbacks or color, assuming summer, leaf-on conditions;

(4) the structure or facility must not be designed or used for human habitation and must not contain water supply or sewage treatment facilities.

(5) the structure shall not be placed on steep slopes.

(6) Saunas must be placed at sanitary setback.

C. **Bluff Impact Zones.** The bluff impact zone shall be determined by the vertical distance from the ordinary high water level (OHWL) inland to a point where the slope levels to 6% over a 100 foot run. The vertical height from the ordinary high water level to the start of the 6% slope shall be measured, and that height shall be multiplied by three and add 30. This area shall serve as the bluff impact zone. No construction or alterations shall occur in the bluff impact zone. Remodeling is allowed without an increase in square footage.

D. **Steep Slopes.** Steep slopes are lands having average slopes over 12 percent, as measured over horizontal distances of 50 feet or more. A qualified natural resource professional must evaluate possible soil erosion impacts and development visibility from public waters before issuing a permit for construction of sewage treatment systems, roads, driveways, structures, or other improvements on steep slopes. When determined necessary, conditions must be attached to issued permits to prevent erosion and to protect existing vegetation screening of structures, vehicles, and other facilities as viewed from the surface of public waters, assuming summer, leaf-on vegetation.

E. **Significant Historic Sites.** No structure or use may be established within 50 feet of a platted or unplatted cemetery unless approved by the State Archeologist. No structure may be placed on a significant historic site in a manner that affects the values of the site unless adequate information about the site has been collected and documented in a public repository.

F. **Height of Structures.** The maximum height of structures (excluding churches and agricultural structures) shall be 35 feet.

G. **Docks, Stairways, Lifts, and Landings.** Only removable, seasonal docks are allowed. Stairways and lifts are the preferred alternative to major topographic alterations for achieving access up and down bluffs and steep slopes to shore areas. Stairways and lifts must meet the following design requirements:

(1) stairways and lifts must not exceed four feet in width on residential lots. Wider stairways may be used for commercial

properties, public open-space recreational properties, and planned unit developments;

(2) landings for stairways and lifts on residential lots must not exceed 32 square feet in area. Landings larger than 32 square feet may be used for commercial properties, public open-space recreational properties, and planned unit developments;

(3) canopies or roofs are not allowed on stairways, lifts, or landings in bluff or steep slope areas;

(4) stairways, lifts, and landings may be either constructed above the ground on posts or pilings, or placed into the ground, provided they are designed and built in a manner that ensures control of soil erosion;

(5) stairways, lifts, and landings must be located in the most visually inconspicuous portions of lots, as viewed from the surface of the river assuming summer, leaf-on conditions, whenever practical; and

(6) facilities such as ramps, lifts, or mobility paths for physically handicapped persons are also allowed for achieving access to shore areas, provided that the dimensional and performance standards of sub-items (1) to (5) are complied with in addition to the requirements of Minnesota Regulations, Chapter 1340.

H. **Decks.** Decks must meet the structure setback. Decks that do not meet the setback requirements may be allowed without a variance to be added to structures existing on the date that the shoreland structure setbacks were established by ordinance, if all of the following criteria and standards are met:

(1) an evaluation of the property and structure reveals no reasonable location for a deck meeting or exceeding the high water level setback of the structure.

(2) the deck shall not exceed 12 feet in depth and the closest point of the deck shall be no closer than 50% of the required setback of the river classification.

(3) the deck is constructed primarily of wood and is not roofed or screened.

I. **Shoreland Alterations.** Alterations of topography will be regulated to prevent erosion into public waters, fix nutrients,

maintain or enhance shoreland aesthetics, protect historic values, prevent bank slumping, and protect fish and wildlife habitat.

A. Topographic Alterations/Grading and Filling.

NOTE: The grading and filling standards in this Section must be incorporated into the issuance of permits for construction of structures, sewage treatment systems, and driveways. Necessary grading, filling, and excavations under valid construction permits for the construction of structures, sewage treatment systems, and driveways do not require the issuance of a separate grading and filling permit.

(Public roads and parking areas are regulated in Section L.)

1. A grading and filling permit will be required for:

   (a) the alteration of natural topography of more than ten (10) cubic yards of material on steep slopes or within shore or bluff impact zones; and

   (b) the alteration of natural topography of more than 50 cubic yards of material outside of steep slopes and shore and bluff impact zones but within 300' of the river.

2. The following considerations and conditions must be adhered to during the issuance of construction permits, grading and filling permits, conditional use permits, variances and subdivision approvals:

   (a) Grading or filling in any wetland as defined by the Minnesota Wetland Conservation Act must be evaluated to determine how extensively the proposed activity would affect the following functional qualities of the wetland:

   (i) sediment and pollutant trapping and retention;
   (ii) storage of surface runoff to prevent or reduce flood damage;
   (iii) fish and wildlife habitat;
   (iv) recreational use;
   (v) shoreline or bank stabilization; and
   (vi) noteworthiness, including special qualities such as historic significance, critical habitat for endangered plants and animals, or others.

   Alteration activities in wetlands designated by State, County, and Federal regulations are prohibited. The evaluation explained in (1) must also include a

determination of whether the wetland alteration being proposed requires permits, reviews, or approvals by other local, state, or federal agencies such as a watershed district, the Minnesota Department of Natural Resources, or the United States Army Corps of Engineers. The applicant will be so advised.

(b) Alterations must be designed and conducted in a manner that ensures only the smallest amount of bare ground is exposed for the shortest time possible;

(c) Mulches or similar materials must be used, where necessary, for temporary bare soil coverage, and a permanent vegetation cover must be established as soon as possible;

(d) Methods to minimize soil erosion and to trap sediments before they reach any surface water must be used;

(e) Altered areas must be stabilized to acceptable erosion control standards consistent with the field office technical guides of the local soil and water conservation districts and the United States Soil Conservation Service;

(f) Fill or excavated material must not be placed in a manner that creates an unstable slope;

(g) Plans to place fill or excavated material on steep slopes must be reviewed by qualified professionals for continued slope stability and must not create finished slopes of 30 percent or greater. Fill or excavation of more than ten cubic yards in the shore impact zone and on steep slopes requires a permit from the county;

(h) Fill or excavated material must not be placed in bluff impact zones;

(i) Any alterations below the ordinary high water level of public waters must first be authorized by the commissioner under Minnesota Statutes, section 103G.241 and 103G.245;

(j) Alterations of topography must only be allowed if they are accessory to permitted or conditional uses and do not adversely affect adjacent or nearby properties; and

(k) The placement of natural rock riprap, if practical, is permitted if the finished slope does not exceed three

feet horizontal to one foot vertical, the landward extent of the riprap is within ten feet of the ordinary high water level, and the height of the riprap above the ordinary high water level does not exceed three feet.

3. Alterations which are not permitted in the river corridor include the following:

(a) Activities that cause unnecessary potential for soil erosion.

(b) An alteration that will cause water backup on adjacent properties.

(c) Land disturbances that significantly retard or severely impede the drainage of adjacent properties.

(d) Intensive vegetation clearing within shore and bluff impact zones and on steep slopes.

J. **Vegetation Alterations.** Forestry management regulations and guidelines are listed in the Fish, Wildlife, and Forestry Section of this plan for areas outside of the shore impact zone. The removal of natural vegetation (i.e. trees, shrubs, and plants) within the shore and bluff impact zones is restricted and limited to the following when they occur in a non-commodity situations:

a. The removal of diseased, dead, dangerous, and storm or fire damaged trees, shrubs, and plants.

b. The trimming and pruning of trees, shrubs and plants.

c. The removal of 25% of trees (greater than two inches in diameter at breast height), shrubs and plants. Note: This means no more than 25% of the trees may be removed between the principal structure and the water body within the impact zone. The vegetation removed is replaced with trees, shrubs and plants that have similar, or more, beneficial ecological, erosion preventive and screening values than previously existed. Call the DNR Forestry Division for suggestions on trees, shrubs, and plants to replace those that were removed.

d. Existing shading of the water's surface shall be maintained.

e. Removal of trees, shrubs and plants shall be accomplished through human means (i.e. hands, ax, saw, etc.) and shall not be done by heavy equipment.

K. **Connections to the rivers.** Excavations where the intended purpose is connection to the St. Louis, Cloquet, or Whiteface Rivers such as boat slips, canals, lagoons, and harbors, must be managed by local shoreland controls and the Department of Natural Resources. Permission for excavations may be given only after the Minnesota Department of Natural Resources Commissioner has approved the proposed connection to the rivers.

L. **Placement and Design of Roads, Driveways, and Parking Areas.** Public and private roads and parking areas must be designed to take advantage of natural vegetation and topography to achieve maximum screening from view from the rivers. Documentation must be provided by a qualified individual that all roads and parking areas are designed and constructed to minimize and control erosion from entering the St. Louis, Cloquet, or Whiteface Rivers consistent with the field office technical guides of the local soil and water conservation district, or other applicable technical materials.

Roads, driveways, and parking areas must meet structure setbacks and must not be placed within bluff and shore impact zones, when other reasonable and feasible placement alternatives exist. If no alternatives exist, a variance may be considered within these areas, if the design minimizes adverse impacts.

Public and private watercraft access ramps, approach roads, and access-related parking areas, where allowed, may be placed within shore impact zones provided methods to minimize soil erosion conditions are used. For private facilities, the grading and filling provisions of Section I and J of these development standards must be met.

M. **Stormwater Management/Urban Runoff.** The following general and specific standards shall apply in urban and recreational river classifications due to the smaller lot size:

a. When possible, existing natural drainage ways, wetlands, and vegetated soil surfaces must be used to convey, store, filter, and retain stormwater runoff before discharge into the St. Louis, Cloquet, or Whiteface Rivers.

b. Development must be planned and conducted in a manner that will minimize the extent of disturbed areas, runoff velocities, erosion potential, and reduce and delay runoff volumes. Disturbed areas must be stabilized and protected as soon as possible and facilities or methods used to retain sediment on the site.

c. When development density, topographic features, and soil and vegetation conditions are not sufficient to adequately handle stormwater runoff using natural features and vegetation, various types of constructed facilities such as diversions, settling basins, skimming devices, dikes, waterways, and ponds may be used. Preference must be given to designs using surface drainage, vegetation, and infiltration rather than buried pipes and man-made materials and facilities.

Specific Standards for Stormwater Management/Urban Runoff:

a. Impervious surface coverage of lots must not exceed 25 percent of the lot area in Urban and Recreational classifications.

b. When constructed facilities are used for stormwater management, documentation must be provided by a qualified individual that they are designed and installed consistent with the field office technical guide of the local soil and water conservation districts.

c. New constructed stormwater outfalls to the rivers must provide for filtering or settling of suspended solids and skimming of surface debris before discharge.

N. **Agriculture Use Standards.**

1. **Permitted Areas:** General cultivation farming, grazing, nurseries, horticulture, truck farming, sod farming, and wild crop harvesting are permitted uses inn remote, rural/agricultural, and recreational classifications if steep slopes and shore and bluff impact zones are maintained in permanent vegetation or operated under an approved conservation plan (Resource Management Systems) consistent with the field office technical guides of the local soil and water conservation districts or the United States Soil Conservation Service.

2. **Animal feedlots:** Animal feedlots, a confined area in which manure may accumulate and soil may become trampled, must meet the following standards:

(a) new feedlots must not be located in the shore of the St. Louis, Cloquet, or Whiteface Rivers or in bluff impact zones and must meet a minimum setback of 300 feet form the ordinary high water level of the rivers; and

(b) modifications or expansions to existing feedlots that are located within 300 feet of the ordinary high water level or within a bluff impact zone are allowed if they do not further encroach into the existing ordinary high water level setback or encroach on bluff impact zones.

3. **Animal Waste Systems:** Animal waste and feedlot runoff must be disposed of in an environmentally sound manner according to Minnesota Rules Chapter 7020. In no case shall runoff from waste discharge directly into the St. Louis, Cloquet or Whiteface Rivers or unsealed wells or wetlands.

4. **Riparian Management in Agricultural River Classification:**

(1) Livestock should be kept out of the riparian zone, unless it is permitted under a Resource Management System. For the purposes of this requirement, the riparian zone shall be defined as the water, shore and bluff impact zone.

(2) An alternative water source should be provided whenever possible for streambank protection.

(3) Follow Agricultural Best Management Practices to prevent nonpoint source pollution such as:

(a) Control soil erosion by adopting practices such as crop rotation, seeding critical areas to grass, and managing animal grazing.

(b) Apply fertilizer and animal waste on cropland according to soil test recommendations and crop needs. Apply all pesticides according to the label directions and all state and federal laws.

(c) A filter strip will be maintained between the river and cropland or pasture. The filter strip width will be equal to the bluff Impact Zone or a minimum of 20 feet. this will minimize the runoff of sediment, pesticides, and other pollutants into the rivers. Filter strips and bluff impact zones are to be kept in permanent vegetative cover and managed as described in the Forestry, Fish, and Wildlife Section of this Plan.

4. **Soil Farming of Contaminated Soils:** Soil farming is prohibited in the Primitive, Remote, Recreational, and Urban river classifications. Soil farming of contaminated soils in

Rural/Agriculture river classifications is prohibited within 500 feet of the river. Beyond 500 feet, soil farming is allowed only with a conditional use permit and a single site application not to exceed 1500 cubic yards.

O. **Extractive Use Standards.** Extractive use refers to the removal of surface materials (sand and gravel) or mineral resources. If minerals are removed, DNR permits are required. See Section V for more details.

1. An extractive use site development and restoration plan must be developed, approved by the county, and followed over the course of operation of the site. The plan must address dust, noise, possible pollutant discharges, hours and duration of operation, and anticipated vegetation and topographic alterations. It must also identify actions to be taken during operation to mitigate adverse environmental impacts, particularly erosion, and must clearly explain how the site will be rehabilitated after extractive activities end.

2. Processing machinery must be located consistent with setback standards for structures from ordinary high water levels of public waters and from bluffs.

3. Setback for the extractive use site is the structure setback identified in each river classification of the land use policy.

P. **Water Supply.** Any public or private supply of water for domestic purposes must meet standards for water quality of the Minnesota Department of Health and the Minnesota Pollution Control Agency. Private wells must meet the Water Construction Code of the Minnesota Department of Health.

Q. **Sewage Treatment.** Any premises used for human occupancy must be provided with an adequate method of sewage treatment, as follows:

1. Publicly-owned sewer systems must be used where available.

2. All private sewage treatment systems must meet the State and County standards for individual sewage treatment systems contained in the document titled, "Individual Sewage Treatment Systems Standards, Chapter 7080", a copy of which is hereby adopted by reference and declared to be a part of this plan.

3. On-site sewage treatment systems must meet the sanitary setback for each river classification.

4. All proposed sites for individual sewage treatment systems shall be evaluated in accordance with the criteria in sub-item (a)-(b). If the determination of a site's suitability cannot be made with publicly available, existing information, it shall then be the responsibility of the applicant to provide sufficient soil borings and percolation tests from on-site field investigations.

Evaluation criteria:

a. depth to the highest known or calculated ground water table or bedrock;
b. soil conditions, properties, and permeability;
c. slope;
d. the existence of lowlands, local surface depressions, and rock outcrops;
e. the on-site water supply.

5. Nonconforming sewage treatment systems shall be regulated and upgraded in accordance with Section R of this ordinance.

R. **Nonconforming Lots of Record, Structures, and Sewage Treatment Systems.** All legally established nonconformities as of the date of the adoption of this plan may continue, but they will be managed according to applicable state statutes and other regulations of this community for the subjects of alterations and additions, repair after damage, discontinuance of use, and intensification of use; except that the following standards will also apply in shoreland areas:

1. Construction on nonconforming lots of record.

a. Lots of record are grandfathered in at 50% of the lot width and area in all river classes except urban. Urban areas require 65% of the lot width of 200 feet and lot area of 60,000 square feet.

b. A lot of record is a lot which is part of a subdivision recorded in the Office of the County Recorder or Registrar of Titles, or a lot or parcel described by metes or bounds, the description of which has been lawfully created and recorded prior to the date of enactment of this plan thereto provided that a lot on Federal, State, tax forfeited or Minnesota Power lands which have been leased out prior to the date of enactment

of this plan shall be considered a lot of record even though that lot has not been individually recorded in the Office of the County Recorder or Registrar of Titles.

c. The lot has been in separate ownership from abutting lands at all times since it became substandard.

d. The lot created complied with official controls in effect at the time.

e. Sewage treatment and setback requirements are met.

f. If, in a group of two or more contiguous lots under the same ownership, any individual lot does not meet the minimum lot size requirements of this plan, the lot must not be considered as a separate parcel of land for the purpose of sale or development. The lot must be combined with one or more contiguous lots so they equal requirements of this plan.

2. Nonconforming structure.

a. All additions or expansions to the outside dimensions of an existing nonconforming structure must meet the setback, height, and other requirements stated in this plan. Any deviation from these requirements must be authorized by a variance.

b. Nonconforming structures located in the corridor may expand without a variance if the following standards are met:

(1) The existing structure meets or exceeds a ground floor area of 400 square feet;

(2) The existing structure does not encroach upon a side or road setback;

(3) The existing structure (including deck) is set back from the shore a minimum 25% of the required shoreline setback, whichever is greater.

(4) The height of the proposed addition, or completed structure, shall not exceed the height of the existing structure by more than two feet;

(5) The structure existed before the structure setback requirements were established;

(6) An evaluation of the property and structure reveals no reasonable location for an addition or deck meeting or exceeding the existing ordinary high water level setback of the structure;

(7) The addition does not encroach upon the septic treatment system or expansion area; and

(8) In no event shall an addition to the rear exceed 50%, or an addition to the side exceed 25% of the original ground floor area.

3. Nonconforming sewage treatment systems.

All land use permits issued within the planning corridor of the St. Louis, Cloquet, or Whiteface Rivers shall require an inspection of the sanitary system reviewed to determine if the system is failing or if the proposed land use permit would adversely impact the existing sewage system or the expansion area for the sewage system.

No land use permit will be issued if there is such an adverse impact or the system is failing unless the sanitary system is upgraded according to County standards with final approval given to the system by the County.

The County shall develop administrative guidelines relating to the implementation of this procedure including provisions for not undertaking a review when a system has recently been approved or reviewed by the county.

S. **Subdivision/Platting Provisions.**

Land suitability. Each lot created through subdivision, including planned unit developments authorized under Section T of these development standards, must be suitable in its natural state for the proposed use with minimal alteration. Suitability analysis by the local unit of government shall consider susceptibility to flooding, existence of wetlands, soil and rock formations with severe limitations for development, severe erosion potential, steep topography, inadequate water supply or sewage treatment capabilities, near-shore aquatic conditions unsuitable for water-based recreation, important fish and wildlife habitat, presence of significant historic sites, or any other feature of the natural land likely to be harmful to the health, safety, or welfare of future residents of the proposed subdivision or of the community.

Consistency with other controls. Subdivisions must conform to all official controls of the county. A subdivision will not be approved where a later variance from one or more standards in official controls would be needed to use the lots for their intended purpose. In areas not served by publicly owned sewer and water systems, a subdivision will not be approved unless a domestic water supply is available and a sewage treatment system consistent with the provision of this plan can be provided for every lot. Each lot shall meet the minimum lot size and dimensional requirements as stated int eh river classifications of this plan, including at least a minimum contiguous lawn area, that is free of limiting factors sufficient for the construction of two standard soil treatment systems. Lots that would require use of holding tanks must not be approved.

Information requirements. Sufficient information must be submitted by the applicant for the community to make a determination of land suitability. The information shall include at least the following:

(1) Topographic contours at ten-foot intervals or less from United States Geological Survey maps or more accurate sources, showing limiting site characteristics;

(2) The surface water features required in Minnesota Statutes, section 505.02, subdivision 1, to be shown on plats, obtained from United States Geological Survey quadrangle topographic maps or more accurate sources;

(3) Adequate soils information to determine suitability for building and on-site sewage treatment capabilities for every lot from the most current existing sources or from field investigations such as soil borings, percolation tests, or other methods;

(4) Information regarding the location of wetlands from the National Wetland Inventory: adequacy of domestic water supply; extent of anticipated vegetation and topographic alterations; near-shore aquatic conditions, including depths, types of bottom sediments, and aquatic vegetation; and proposed methods for controlling stormwater runoff and erosion, both during and after construction activities;

(5) Location of 100-year flood plain areas and floodway districts from existing adopted maps or data; and

(6) A line or contour representing the ordinary high water level, the "toe" and the"top" of bluffs, and the minimum building setback distances from the top of the bluff and the river.

Dedications. When a land or easement dedication is a condition of subdivision approval, the approval must provide easements over natural drainage or ponding areas for management of stormwater and significant wetlands.

Platting. All subdivision that create five or more lots or parcels that are 2-1/2 acres or less in size must be processed by the local government as plats in accordance with Minnesota Statutes, Chapter 505. Local governments must not record parcels or issue building or sewer permits for lots created after enactment of official controls under parts 6120.2500 to 6120.3900 that are not part of officially approved subdivisions.

Controlled Access on Recreational Lots. Lots intended as controlled accesses to public waters or for recreational use areas for use by non-riparian lots within a subdivision must meet or exceed the sizing criteria contained in this plan.

T. **Planned Unit Developments (PUD)**

Planned unit developments are commercial or residential dwelling units and usually involve clustering these units to provide areas of common open space, density increases, and a mix of structure types and land uses. The goal of these standards and criteria is to provide uniform standards for the optimization of development opportunities and maximum environmental protection on any given planned unit development site.

Planned unit developments are defined as multiple residential or commercial dwelling units. They include but are not limited to town homes, condominiums, motels, hotels, resorts and related commercial activities, consisting of five or more units.

Density Standards
The planned unit development regulations found in the Department of Natural Resources Statewide Shoreland Management

Standards shall serve as the minimum standards in the planning corridor of St. Louis, Whiteface and Cloquet Rivers.

The floor area ratios designated by the DNR for urban, agricultural, and tributary river segments will not be used. The floor area ratios designated by the DNR for transitional and forested river segments correspond to the Remote and Rural/Agricultural river classifications outlined in this plan. The floor area ratios designated by the DNR for remote river segments correspond to the Recreational and urban river classifications outlined in this plan. Specifically, the appropriate floor ratio area for the river classifications is a follows*

Average unit floor area (sq.ft.)	Remote and Rural/Agricultural River Classifications	Recreational and Urban River River Classifications
200	.020	.010
300	.024	.012
400	.028	.014
500	.032	.016
600	.038	.019
700	.042	.021
800	.046	.023
900	.050	.025
1000	.054	.027
1100	.058	.029
1200	.064	.032
1300	.068	.034
1400	.072	.036
1500	.075	.038

*For average unit floor areas less than shown, use the floor area ratios listed for 200 square feet. For areas greater than shown, use the ratios listed for 1500 square feet. For recreational camping areas, use the ratios listed at 400 square feet. Manufactured home sites in recreational camping areas shall use a ratio equal to the size of the manufactured home, or if unknown, the ratio listed for 1000 square feet.

Design Criteria

1. Structures, parking areas, and other facilities must be designed and placed to reduce visibility as viewed from the rivers, roads, and adjacent shorelands by vegetation, topography, increased setbacks, color, or other means acceptable to the local unit of government, assuming summer, leaf-on conditions.

2. Units, recreation facilities, and commercial uses must be clustered into one or more groups and located on suitable areas of the development site. They must be designed and located to meet the dimensional standards contained in this plan. Setbacks from the ordinary high water level must be increased for developments with density increases. Maximum density increases may be allowed only if structure setbacks from the ordinary high water level are increased to at least 50 percent greater than the minimum setback, or the impact on the river is reduced an equivalent amount through vegetative management, topography, or additional means acceptable to the local unit of government and the setback is at least 25 percent greater than the minimum setback.

3. At least 50% of the development area must be provided for open space of the users and residents of the development. road right-of-ways, land covered by road surfaces, parking areas, units, structures, except water-oriented accessory structures or facilities, are considered developed areas and should not be included in the computation of minimum open space.

4. The appearance of open space areas, including topography, vegetation, and allowable uses must be protected by the use of restrictive deed covenants, permanent easements, public dedication and acceptance, or other equally effective and permanent means.

5. Areas with physical characteristics unsuitable for development in their natural state, such as wetlands or areas containing significant historical sites or unplatted cemeteries, shall be considered open space.

6. Open space may include outdoor recreational facilities for use by the owners of the dwelling units or sites, or the public. Open space does not include commercial facilities or uses, but may contain water-oriented accessory structures or facilities.

7. The shore impact zone, based on normal structure setbacks, should be included as open space. At least 50 percent of the shore impact zone area of existing developments or at least 70 percent of the shore impact zone area of new developments must be protected in their natural or existing state.

8. Shore recreation facilities, including swimming areas, docks, and water craft mooring areas, and launch ramps, must be handicap accessible, safe to the user, centralized and located in areas suitable to them. Suitability will be determined by evaluation of at least the land slope, water depth, vegetation,

soils, depth to ground water and bedrock, or other relevant factors.

9. The number of spaces provided for continuous beaching, mooring or docking of watercraft must not exceed one for each allowable dwelling unit or site in the first tier. Launching ramp facilities, including a small dock for loading and unloading equipment, must be provided for use by the occupants of the units or sites in other tiers.

10. These requirements do not apply in urbanized areas within municipalities.

Sewage Disposal Standards

Commercial and residential planned unit developments must be connected to publicly owned water supply and sewer systems, if available. On-site water supply and sewage treatment systems must be designed and installed to meet applicable rules of the Minnesota Department of Health and the Minnesota Pollution Control Agency and the County. On-site sewage treatment systems must be located on the most suitable areas of the development, and sufficient lawn area free of limiting factors must be provided for a replacement soil treatment system for each sewage system.

Plan approval

At the time of application, planning, and scheduled development, the proposed facility shall be under unified control or ownership. The applicant will provide a detailed development plan which shall include a description of:

1. The property under consideration, including property boundaries, contours, on-site features, roads, lakes, rivers and other relevant features.

2. Building elevations, location on site, proposed uses, number of units, and commercial operations.

3. A concept statement describing the project.

4. Parking areas and driveways for both residences and commercial activities, vehicle loading/unloading areas, proposed public road entrances, and projected traffic generation of the proposed development.

5. Proposed phasing of the final development.

6. Description of how the project will operate after completion.

7. Nature of proposed ownership after completion.

8. Proposed fire protection.

9. Proposed home owners association agreement, where applicable.

10. Detailed landscape plan which shows existing vegetation, proposed alterations, new plantings, and landscaping.

11. Recreational space location and use.

12. Water sources and water supply system plans.

13. Proposed sewage treatment system plans.

14. Storm water runoff plans (construction and operation).

15. Erosion control plan for shoreline, where applicable.

16. Erosion control plan for site (construction and operation).

17. Evidence of application for appropriate permits, state and federal.

18. Evidence of availability of necessary public utilities.

19. Proposed financial records and necessary performance bonds or escrow agreements to protect the local unit of government's financial liability for site restoration, landscaping and erosion control measures, and sewage treatment systems.

Conformance with adjacent property/other information.

The proposed development plan will demonstrate that the development will conform with adjacent development and be screened from the lake, adjacent roads, and adjacent properties. Any other information deemed to be necessary by the Planning Commission or Land Use Office will be provided by the applicant. Plan modifications or special conditions or performance standards may be required.

U. **Campgrounds.** Campgrounds must conform to the development density standards set forth for in the St. Louis County Land Use Ordinance, No. 46. Floor area ratios for campgrounds are .014.

V. **Geology and Mineral Resource Management.**

Active mineral operations, identified sub-economic mineral resources, and speculative mineral resources exist near the St. Louis River classification areas. Some metallic mineral resources may have high prospective.

On a regional scale, mineral resources are closely related to the type of geologic unit hosting a deposit. Mineral resources are found both within solid bedrock and within or above the overburden which is unconsolidated materials lying upon the bedrock.

Bedrock in the St. Louis River classification areas falls into three general geologic units listed from oldest to youngest:

1) the Virginia Formation and its metamorphosed equivalent, the Thomson Formation, which are sandstones and mudstones with varying graphite content:

2) the Duluth Complex intrusive rocks;

3) the Fond du Lac Formation, which is primarily a sandstone.

Overburden may consist of:

a) glacial drift, crushed bedrock materials in sizes from clay to boulders; or,

b) saprolite, a less common, clay-rich, residual material (below the glacial drift) which resulted from intense tropical weathering of the bedrock.

With younger overburden covering the bedrock, most mineral resources are hidden and a complete inventory is not economically feasible. In Minnesota the private sector invests significant time and capital to discover, develop, and market potential mineral resources. Without an inventory, geologic settings of known mineral deposits are used to infer the presence of mineral resources in similar geologic settings. This reasoning has worked well to provide an abundant and sustainable supply of most mineral resources.

Some examples of potential or existing mineral resources within the river classification areas of this plan include:

!Peatlands clearly exist adjacent to river classification areas. Some of these lands may contain marketable horticultural peat, however, a comprehensive inventory and future development predictions are not available.

!Heavy minerals such as gold, platinum group elements, and ilmenite (titanium) are known to exist in small quantities in sand and gravel here. These resources could become marketable in the future as a by-product to sand and gravel production.

!Virginia and Thomson formations could host mineral resources of copper, lead, zinc, gold, silver, barite, cobalt, nickel or bismuth. Further, slate quarries could be found in the Thomson formation in the future.

The Duluth Complex unit contains an active crushed stone quarry, and current development prospects for dimension stone and ilmenite. This bedrock unit also contains identified sub-economic metallic mineral resources for copper, nickel, platinum group elements, and gold, as well as other speculative resources.

!The Fond du Lac formation could host copper, cobalt, nickel, silver, or bismuth mineral resources.

Unknown types of mineral deposits could also be discovered within the St. Louis River study area.

Mining of Metallic Minerals with no surface disturbance is allowed within a quarter mile of the river in Primitive, Remote, Recreational and Rural/Agricultural classifications of this plan. This allows protection to important areas while still allowing mineral owners the potential to access underground mineral resources. The allowance of underground mining of metallic minerals without surface disturbance does not mean, however, that mining can occur. Any proposed mining operation must first go through the state environmental review process and obtain required permits. Mining of peat is prohibited within all river classification areas contained in this plan.

W. **Motorized Use.** Motorized use in the river classification areas will not be regulated. These areas will continue to be enjoyed through motorized uses such as motor boats, snowmobiles, and all terrain vehicles. In the future, the St. Louis River Board will be developing a recreational management plan in cooperation with the DNR. This future plan would examine and address, but not be limited to, water surface regulations along with campsite, access, and portage acquisition and development.

X. **Landfills.** Landfills existing within the river classification areas will remain and be allowed by the grandfather clause. New landfills will be prohibited in the river classification areas.

Future Planning and Review Activity

Unique Protection Areas should be identified through inventory and baseline studies.

The St. Louis River Board will attempt to get the Minnesota County Biological Survey conducted in St. Louis, Carlton and Lake Counties as soon as possible.

The St. Louis River Board will have an opportunity to review and comment on subdivision plats, conditional uses, variances, and amendments to this plan or the implementing ordinance for each local jurisdiction.

Additional future work in the corridor should include:

a. Examination of ditch system.
b. Identification of erosion problem areas.
c. Identification of animal waste problem areas.
d. Educational efforts for landowner's stewardship should be developed.

LAND ACQUISITION

The St. Louis River Board believes some riparian zones along the St. Louis, Whiteface, and Cloquet Rivers need greater protection than can be provided through zoning controls. The riparian zones -the land area and ecosystem adjacent to the rivers- are vital to the health of the river system and offer high quality resource, scenic, recreation, historic and archaeological values. It is the goal of the St. Louis River Board to purchase undeveloped, sensitive riparian lands from voluntary and willing sellers to be placed in state ownership for public use and protection.

The purchase and subsequent protection of these riparian zones will help decrease uncontrolled development and increase the health of the rivers by maintaining and restoring vegetation, improving the filtering out of run-off pollutants, cooling water temperatures, providing wildlife and aquatic species habitat, and preserving the natural beauty.

Site Criteria

Criteria was developed by the Citizen Advisory Committee of the St. Louis River Board for the evaluation of land to be purchased. Nine criteria were used to identify and rank blocks of land for acquisition. Such blocks are defined as those areas meeting a majority of the acquisition criteria and having the following characteristics:

1) Areas important for fish and wildlife

Examples of important fish and wildlife habitats include: stands of oak, northern hardwoods, white pine, upland white cedar, upland grass and brush openings, old growth forest, eagle nests, heron rookeries, deer winter cover areas, wood turtle nesting sites, fish spawning sites, springs, seep areas, and wetland complexes, especially emergents.

2) Areas subject to development pressure

Lands that are within commuting distance from major population centers (1/2 hour - 45 minute drive), are readily accessible from gravel roads, have access to utilities, have scenic qualities, provide good access to the river, are heavily wooded, have historical patterns to subdivide and develop, or if developed would pose threat to the resource. In addition, lands that are subject to development pressure which have extensive areas of wetlands or floodplain either in the

development area or along potential access routes. Extensive floodplains are those areas where the floodplain extends beyond the structure setback. Extensive wetlands are those areas which contain wetlands to the extent where wetland avoidance for road construction is not feasible according to the sequencing provisions of the Minnesota Wetland Regulations and/or wetlands constituting more than 50 percent of the land area within 300 feet of the river.

3) Significant Archeological or Historical Sites/Scientific and Natural Areas

Lands potentially having or identified as having significant archeological or historical importance, artifacts, etc. Also lands proposed and approved as scientific and natural areas.

4) Areas with scenic value

Lands containing old growth timber, high bluffs, unique geologic features, lack of visible man-made objects (development such as roads, bridges, houses, etc.), as viewed from the river,a nd white-water areas.

5) Contiguous ownership

Lands which are owned by a single owner and include significant amounts of river frontage. Lands contiguous to existing public owned land, or lands which would, if acquired, consolidate public ownership, or expand it in critical areas. In addition, lands that are contiguous to other lands purchased.

6) Steep embankments with erodible soils

Examples include former glacial Lake Upham (Forbes to Cotton area) and the Superior Lake Plain (below Cloquet).

7) Environmental study areas

Contiguous lands (preferable under single ownership) having significant, observable ecological features of ecological diversity which is located close to student base and could serve as ecological monitoring area.

8) Economic value of land

Lands with potential tourism opportunities or have the potential to attract adjacent economic development which is strictly compatible with the natural environment.

9) Traditional recreation use areas

Lands which are presently important traditional, recreation use areas or portage areas.

Priority blocks for Public Acquisition

The Citizens Advisory committee of the St. Louis River Board has recommended the Board purchase all available blocks of land currently owned by Minnesota Power. The Northeastern Minnesota electrical company currently owns approximately 22,000 acres and has agreed to hold property identified for acquisition for a reasonable time until funding becomes available. Current leases on Minnesota Power lands identified for public acquisition will continue for the lifetime of the leaseholder.

Other blocks of land for acquisition include those held in corporate or private ownership who are willing sellers or voluntary donors. These lands need to be identified in the future.

Trading for riparian zone lands from other private landowners will also be considered based on available purchase of non-riparian lands from Minnesota Power.

Acquisition Priority Schedule

The blocks of land were then prioritized according to the number of criteria which matched as follows**:

1. Lands adjacent to the St. Louis River on the east side of the river between the Cloquet River and the City of Cloquet. Matching criteria: 1,2,3,4,5,7,8,9

2. Lands adjacent to the St. Louis River south of Interstate Highway 35 to the boundary of Jay Cooke State Park. Matching criteria: 1,2,3,4,5,7,8,9

3. Lands adjacent to the Cloquet River downstream of Island Lake to its confluence with the St. Louis River. Matching criteria: 1,2,3,4,8,9

4. Lands adjacent to the Whiteface River between Kelsey and Meadowlands. Matching criteria: 1,4,6,9

5. Lands adjacent to the St. Louis form the mouth of the Whiteface River to Floodwood. Matching criteria: 1,2,4,6,8,9

6. Lands from Forbes to Toivola. Matching criteria: 1,3,4,5,6,9

7. Other blocks including the purchase of private lands from voluntary sellers.

This list of blocks will serve as a guide only to identify acquisition lands in addition to the appraisal values. Priority blocks for acquisition may change as additional information becomes available. Lower priority blocks may be purchased ahead of higher priority blocks where the St. Louis River Board deems necessary. Additional privately held blocks need to be identified.

Priority Acquisition Blocks Map

FORESTRY, FISH and WILDLIFE

Historical Overview

The St. Louis Cloquet, and Whiteface Rivers have played a significant role in the history of Northeastern Minnesota. They were the major transportation routes for Native Americans, explorers, missionaries and fur traders. Later they were vital to the logging industry. Today, they provide important fish and wildlife habitat that supports fishing, hunting, canoeing and enjoyment of scenic beauty.

Prior to the 1870's, the landscape was dominated by stands of pine and spruce. These mature conifer forests were typically inhabited by species such as moose, caribou, bear, wolf, lynx, fox, pine marten and spruce grouse. Deer and other species common today were rare or absent from these dense forests and game was often scarce. The Native Americans usually lived close to water and ate moose, beaver, fish, birds, wild rice, berries and maple syrup.

By the mid-1800's, beaver and other furbearers were scarce dues to the fur trade. Lumber, however was soon in high demand for homes, farms and railroad ties for settlement after the 1854 treaty with the Ojibwe. Many settlements were established along the rivers and railroads including Brimson, Brookston, Carlton, Cloquet, Cotton, Floodwood, Forbes, Meadowlands, Paupores, and Thompson.

Large logging camps, railroads and sawmills were built throughout the pine forests of the St. Louis River watershed in the 1880's. The rivers and their tributaries were used for log-drives. Their channels were cleared of fallen trees, snags and rocks to facilitate the movement of logs. Over 100 dams were also built in the watershed to create flood crests for floating logs downstream. The clearing scouring from log-drives removed much of the natural structure from the rivers that provided important habitat for fish and wildlife.

Lumbering, fires and farmland clearing had removed nearly all the large pine stands by the 1920's. The vegetation and wildlife were greatly altered by these disturbances. Mature conifer forests were replaced by farm fields and second-growth stands of aspen, birch and brush that regenerated on the logged and burned-over land. Wildlife species typical of the conifer forests were replaced by those that favor young hardwoods forest.

The forest was altered to the point where prairie wildlife species such as sharp-tailed grouse and even prairie chickens become abundant. Wildlife species that thrive in second growth forests such as white-tailed deer, ruffed grouse, woodcock, snowshoe hare, coyote and beaver expanded their ranges. These species responded slowly at first, held in check by market and subsistence hunting, but become abundant as game laws were enacted. They become the popular game species sought by hunters and remain so today.

Existing Plant, Wildlife, and Fish Communities

The vegetation of the St. Louis River watershed is marked by its variety due to the diverse soils and topography of the region. The St. Louis Watershed is a high, level plateau surrounded by the higher hills of the Mesabi range on the north and the Lake Superior highlands on the east. The center of the watershed is a flat glacial lake bed covered with silt, sand, and peat soils that are poorly drained and swampy. Bogs are common in depressions.

Southeast of the flat glacial lake bed lay a series of long, low rounded hills called drumlins, oriented to the southwest. The soils of these glacially formed hills are a complex mix of loam, silt, sand and clay with occasional deposits of stones or boulders. The Cloquet and Whiteface Rivers and their tributaries flow southwesterly in swampy valleys between these ridges. Outcrops of bedrock are common in the eastern half of the watershed.

Steeper, more rugged hills of glacial moraine form the southern and eastern borders of the watershed. The soils are loamy with inclusions of sand and gravel. The lower end of the St. Louis River drops through deep, steep-sided gorges of clay and bedrock before emptying into the broad, slow moving St. Louis Bay in Duluth.

The rivers of the watershed are moderately-wide, shallow, slow meandering streams with dark, bog-stained waters. Stretches of quiet water are often interrupted by riffles and boulder rapids. Most of the banks are wooded, although some farmland occurs along the rivers in the vicinity of Cotton, Meadowlands, Floodwood and Brookston.

Many wetlands are also found along the rivers. Sedge meadows, shrub swamps, beaver ponds, wooded swamps, and conifer bogs are the most common, especially in the headwaters. A few cattail marshes and wild rice beds also occur.

Aquatic plant growth in the river channels is limited by the steep banks, unstable bottoms, and dark waters. Aquatic plants do not occur as a continuous fringe along the rivers but are restricted to quiet pools, shallow backwaters, and stream margins with damp soils. In these protected waters of the river and adjacent wetlands, the common submerged aquatics are pondweeds, Canada waterweed, wild celery, and coontail. Emergents include cattail, wild rice, bulrush, burreed, arrowhead, spikerush, horsetail, sedge, and reed canary grass. Floating leaved aquatics like duckweed, and water lily occur in still backwaters.

The only aquatic plant found throughout the rivers is filamentous green algae which grows in long strands attached to rocks and branches.

On the uplands adjacent to the river, mixed forests of conifers and deciduous trees dominate the landscape. The most abundant tree species are aspen, birch, balsam fir, and white spruce. Scattered stands of large red and white pine with patches of upland cedar still remain, but they are no longer predominant. There are some stands of jack pine on the very sandy soils. Where the loamy soils border the rivers, mixed stands of maple, basswood, green ash, iron wood and red oak occur. Common shrubs in the uplands are hazel, dogwood, mountain maple, highbush cranberry, raspberry and wild rose.

Logging has increased in recent years *leaving* the upland forest interspersed with cut-overs, logging roads, and varied ages of regenerating forest. Many areas have also been planted with red pine and white spruce.

Where the rivers flow through broad floodplains, there are lowland hardwood forests of black ash, balsam poplar, and silver maple. Elm was once common too, but has nearly disappeared as a result of Dutch Elm disease. Where low peat bogs border the rivers, the vegetation consists of black spruce, tamarack, and white cedar. The understory in the lowlands is composed of sphagnum, sedge, leather leaf, bog birch, Labrador tea, willow, and alders. Large peat bogs are common in the western half of the watershed. Many of them have extensive ditch systems dug in the early 1900's in a failed effort to drain them for farmland.

With its vast area and variety of forests and wetlands, the St. Louis River watershed supports an abundance and diversity of wildlife. It provides habitat for over 300 species including about 250 resident and migrant birds, 50 mammals and 18 reptiles and amphibians. A list of wildlife, reptile, and amphibian species appears in the Appendix.

The white-tailed deer, black bear, moose, and timber wolf are the principal large mammals of the forests. The main forest furbearers are the bobcat, coyote, red fox, fisher, and pine marten. The porcupine, snowshoe hare, wood chuck, striped skunk, red squirrel, chipmunk, and several kinds of mice, shrews, and bats make up the small mammals of the forest. Common birds of the forest include: ruffed grouse, spruce grouse, woodcock, raven, common crow, several kinds of hawks and owls, and many species of songbirds. Species associated with the wetlands and rivers include: beaver, otter, mink, muskrat, raccoon, bald eagle, osprey, kingfisher, great blue heron, bittern, snipe, wood duck, mallard, blue-winged teal, ringneck, blue bills, mergansers, common goldeneye, Canada geese, and several kinds of shorebirds and gulls.

The reptiles and amphibians of the river include: the eastern garter snake, painted turtle, snapping turtle, wood turtle, American toad, and several species of frogs and salamanders.

The St. Louis and Whiteface river system supports a diverse warm water fish community. The St. Louis River in Jay Cooke State Park and the Cloquet River also support a cold water (trout) fishery. The Minnesota Department of Natural Resources (MDNR) has conducted several biological surveys over the years beginning with an extensive survey and trout stream management plan published in 1947. In 1967, the MDNR published results from a fishery, water quality, and recreation survey performed on the Cloquet River to provide basic information necessary for management decisions. Information on water quality, fish surveys, and habitat characterization of the St. Louis River was summarized in a 1979 MDNR report and a 1993 U.S. Fish and Wildlife Service/Fond du Lac Reservation report on channel catfish. A representative list of fish species captured in these studies is presented in the Appendix.

Common game fish found in this river system sought by anglers, include channel catfish, walleye, northern pike, and smallmouth bass. Sturgeon, which once thrived on the upper St. Louis River system, may exist in low numbers in the river. Important forage and small sized fish include the longnose and blacknose dance, several shiner species, trout perch, log perch, Johnny darter, and mottled sculpin. Channel catfish is the only species found in the river basin which did not originally occur in either the lower Lake Superior or Upper Mississippi River watersheds. It is speculated that the catfish reached the St. Louis River Basin via a late Pleistocene connection with the St. Croix River.

Optimum fish habitat exists in the St. Louis River system in stream reaches which have the greatest depth variation, relatively high gradient, and high percentage of riffles and rapids with rock substrate. Geology and topography play an integral role in fish

species diversity and abundance within the river system. The highest MDNR St. Louis River electrofishing survey catch rates, in descending order, were obtained in deep water where rocks, boulders and logs were present; in pools below rapids; and in areas where brush and logs were present along the stream edge. The lowest catch rates were recorded in areas of the river characterized by long, straight stretches with a relatively shallow channel and a sandy-clay bottom. The calculated fish species diversity index, which is an indicator of habitat quality, was highest from Seven Beaver Lake to the mouth of the Partridge River and above the city of Cloquet to the mouth of the Whiteface River. The river reach below the Partridge River, which had a lower diversity index, has relatively poor fish habitat due to unstable sandy soils and continual meanders. The straightest reach with the least habitat available was found between the mouth of the Whiteface and Swan Rivers where unstable river channel soils comprised of sand overlying clay or clay from eroding banks occurred.

Riparian Management for Forest, Fish and Wildlife

The riparian zone is the plant zone that exists between the aquatic habitat of the river and the dry upland. The soil, plants and animals of this zone form a living part of the river. It feeds energy to aquatic life in the river through leaf letter and dissolved nutrients, it provides optimum food and cover for upland wildlife, and it provides large woody debris that falls into the river and is necessary to maintain proper stream flow and fish habitat.

Like people, wildlife are attracted to riparian zones and use them more than other habitats. They have plentiful water and rich soils that produce diverse, highly productive plant communities. The sunny edge along the river provides an abundant growth of fruits, berries, and insect foods for wildlife. The large trees, dead snags, log jams, rocks and sand banks that frequently occur along river banks provide a variety of cover that is also very attractive to wildlife.

The riparian zone provides a sheltered environment for wildlife. The conifer covered river valley offers a cool microclimate in the heat of summer, and protection in winter from cold winds.

The riparian area also improves water quality by filtering out sedimentation and pollutants before they get into the river. Tree cover along rivers is critical to fish habitat by providing shade to keep water cool and supplying leaf litter and insects for fish food. Tree trunks add the large woody debris in the river needed to shelter fish, increase the number of pools and riffles, and create deeper water.

Finally, a mature forest cover along the rivers is highly valued by those using the river for fishing, hunting, canoeing and other water related activities. Maintaining the remote, wilderness character of the rivers will protect habitat for sensitive species like the wolf, eagle, osprey, and wood turtle. Once lost, this wild quality is extremely difficult to replace.

A goal of this management plan is to maintain or improve water quality for fish and habitat for a variety of wildlife along the St. Louis and its major tributaries. The objectives to obtain this goal are:

1. Establish mandatory forest management zones and guidelines along the river.
2. Render a future desired condition of a mature to old growth late successional mixed conifer and hardwood riparian forest within the management zones.

3. Establish a forest management review committee to oversee the forestry activities along the rivers.

Forestry Management Zones

TIER ONE

Begins at the top of the river bank and extends outward the following distances:

200 feet: Primitive and Remote:
100 Feet: Rural/Agriculture and Recreational
75 feet: Urban

Desired Future Values: Water Quality Aesthetics
Healthy Forest Biodiversity Wildlife Habitat
Recreation Natural Character
Archeological/Historical Site Preservation

Desired Future Condition: A healthy forest composed of diverse native vegetation types. Older forest communities consisting of long lived conifers and hardwoods are preferred. The objective will be to have forest stands that are natural in appearance and character.

Management Objectives and Standards:

1) This is a no-cut, minimal impact zone. Management activities can only occur if they are within the biological and physical capabilities of the land, and if the intent is to progress toward Tier One Desired Future Values and Conditions as stated above.Examples of management activities which are exempt may include vegetation removal to fight disease from spreading, clean up of an area after a natural disaster such as fire or wind storm, and to maintain utility corridors.

2) All vegetation removal must be done in a manner that provides maximum benefits to wildlife, fisheries, water quality, cultural preservation, and aesthetics.

3) Water Quality Best Management Practices are mandatory in this tier.

TIER TWO

Extends from the edge of the first tier to the edge of the planning corridor as follows:

200 - 2640 feet (1/2 mile):	Primitive
200 - 1320 feet (1/4 mile):	Remote, Recreational and Rural Agriculture
75 - 300 feet (300 feet):	Urban

Desired Future Values: Healthy Productive Forest
Wildlife Habitat
Water Quality
Biodiversity
Aesthetics
Commodity Production
(including timber harvest)
Archeological/Historical Site Preservation

Desired Future Condition: A healthy productive forest with a diversity of native vegetation types and age classes. Stands will be irregular in shape and appear natural. Tree sizes may range from seedlings to trees 90 feet and taller. All age classes may be represented.

Management Objectives and Standards:

1) Commodity production is a desired use in Tier Two. Management activities can occur if they are within the biological and physical capabilities of the land, and if the intent is to progress toward Tier Two Desired Future Values and Conditions as stated above.

2) All vegetation removal for commodity production must be done in accordance with a management plan prepared by a professional forester.

3) Water Quality Best Management Practices are mandatory in this tier.

Forest Management Plans

All vegetation removal for commodity production must be done in accordance with a forest management plan prepared by a professional forester. The development and review of forest management plans are required for both Tier One and Tier Two. Forest activities occurring in Tier One require review and approval of the forest management plan and in Tier Two require only review of the management plan.

1) Exemptions

The only management activities which do not need to be reviewed are:

a) activities related to fighting disease and natural disasters;

b) private lands where cutting is for non-commercial domestic fuel wood;

c) thinning on private lands not related to forest management, if the vegetation removal standards found in the land use section are followed;

2) Management Objectives

The forest management plan must address the following seven management objectives:

1) Extended rotation based on biological rather than economic age.
2) Retention of and management for old growth stands of trees.
3) Biodiversity
4) Replanting of long lived species.
5) Protection of rare and endangered species
6) Consideration of scenic value as seen from the river
7) Consideration of recreation potential for the area

3) Further Information

The following information shall be considered and included in the forest management plan:

a) Description of property, including both a legal description and a general description.

b) General description of the existing conditions in the management area including soils, topography, wildlife, vegetation, wetlands, drainage courses, and known cultural resources.

c) Description of the forest management activities which have taken place or are planned for the same area (i.e. the broader picture of the forest management in the watershed).

d) Description of harvesting methodology to be used including: season of harvesting, amount of harvesting, what vegetation will remain, equipment to be used, access roads to be used or built, how the forest management activity conforms to the management objectives and how Water Quality Best Management Practices will be implemented.

e) How the proposed vegetation management will affect, maintain, or enhance the fisheries, wildlife, and scenic value of the area.

f) What the expected future condition of the site will be after harvesting.

Forestry Review Committee

The Forest Management Review Committee will be a technical subcommittee appointed by St. Louis, Carlton or Lake County. This group will be organized and charged with the evaluation of the forest management plans. This evaluation consists of the review and recommendation to the appropriate reviewing authority. Review of the forest management plans for activities within Tier One and review only of activities within Tier Two shall be based on the guidelines found in the section titled "Forestry Management Evaluation Guidelines". The Forest Management Review Committee within 30 days of receipt of a plan from a unit of government or individual shall forward its recommendation to the appropriate reviewing authority.

The Forest Management Review Committee is also responsible for auditing timber management activities in both Tiers One and Two, provided the members have received the necessary training. This group will also review changes in state regulations and Water Quality Best Management Practices, as well as county forestry policies to determine if amendments to their charge are required.
Membership on the Forestry Management Review Committee will consist of a representative or a designated alternate from the following entities:

a) Minnesota Department of Natural Resources
b) Fond du Lac Business Committee
c) Planning Commission member from impacted county
d) Land Commissioner from impacted county
e) Soil Conservation Service/SWCD
f) Two citizen members

Forestry Management Evaluation Guidelines

The following items are a guide in evaluating forestry management plans:

Forestry Planning/Management

!Consider the top of the river bank as the edge if a cut bank extends to the river or stream edge. (The horizontal distance covered by the bank might be as much as two tree lengths or 150 feet.)

!Allow management activities for practices like tree planting, wildlife opening maintenance, campsites, boat landings, insect and disease control, etc., where special circumstances occur.

!Use extended rotations for timber harvests where ever possible.

!Expand the area of red pine, white pine, white spruce, upland cedar, oak and northern hardwoods along the rivers whenever possible.

!Convert to long lived species where possible especially in areas of extensive birch or aspen/balsam types. This would include planting trees on the bank which will eventually fall into the river.

!Use management techniques that favor the retention of conifers in aspen and birch stands.

!Use winter logging to minimize damage to vegetation and soils.

!Use site preparation techniques and equipment that minimize soil disturbance (e.g. Brakke scarifier).

!Work toward selective harvest where silviculture permits.

!Use Herbicides when necessary for conifer establishment, but low impact, low dosage treatments would be required. With all herbicides the law is "Read and follow label directions".

Harvesting Techniques

!Manage riparian stands in conjunction with other non-riparian stands to economize operations.

!If silvicultural conditions indicate a clearcut operation, modify the cut to leave as much of the small maple, young balsam clumps, cedar, oak, white pine, and yellow birch standing.

!Use harvest techniques that retain slash, cavity trees, super-canopy trees, bud trees, and mast producing trees and shrubs in harvested stands.

Aesthetics

!Use visual management guidelines along rivers that provide for:

- -most clear cuts, slash and roads not being visible;
- -no rows apparent in plantations;
- -harvesting during season of least visitor use;
- -predominately mixed conifer and hardwood stand composition;
- -favoring selective harvest;
- -occasional small (0-5 acre) clear cuts and grass openings for visual diversity.

!Vary the size, shape, pattern, and timing of cuts to create greater biodiversity for wildlife.

Forest Road Construction

!New construction of permanent forest roads should avoid coming within one quarter mile of the river where ever possible.

!Incursion of a forestry road within one quarter mile of the river is permitted only to avoid wetlands or when topographic conditions so warrant or when there is an intent to cross the river.

!Road construction shall follow the technical assistance of the Soil Conservation Service and water quality Best Management Practices.

!Prior to construction of any permanent roads, the road authority shall review all information submitted to it regarding archeological sites in the area. The road authority shall immediately report to the State Archeologist any sites uncovered during construction of the road.

Wildlife Management

!Protect raptor nest sites, rookeries, wood turtles nesting areas and other sensitive habitats with adequate buffers.

Fish Management

!Use bridges instead of culverts if stream crossing is necessary. If culverts are necessary, set culvert bottoms six to twelve inches into the stream bed at the existing stream gradient to facilitate fish migration.

!Instream work will need review by a DNR Hydrologist to determine whether or not a DNR waters permit is needed.

!Plan any work in the trout streams during the period May 1 through September 14 to minimize impact on trout reproduction. Other streams containing warm water species such as bass, northern pike, suckers and walleyes, will require in stream work to be done between June 1 and April 1. The DNR Area Fisheries Supervisor should be contacted to determine appropriate dates.

Streams Managed for Trout

!Maintain black spruce swamps and cedar adjacent to streams managed for trout to serve as cold water reservoirs.

!Maintain and enhance shore and canopy cover along streams managed for trout to maintain shade and cool water temperatures.

!Employ erosion control and bank stabilization/revegetative measures during and after projects that affect the stream corridor.

!Encourage the presence of conifer species to minimize beaver activity which warms the water and causes loss of habitat through sedimentation.

!Preserve large, old trees as cavity trees for wildlife and as potential woody debris for fish habitat when they fall into the water.

!Streams managed for trout are streams or parts of streams that are capable of supporting trout. The existence of trout in these streams is naturally occurring or is aided by the activities of Department of Natural Resources Fisheries personnel. A list of streams currently managed for trout appears in the appendix.

!The water quality in streams managed for trout needs to be protected so that trout can exist in them.

!Streams managed for trout shall have a 200 foot protective corridor beginning at the top of the river bank. This corridor is to be managed primarily for maintenance of trout habitat.

!Maintenance of trout habitat includes the following:

a) Evaluation of current conditions and history;

b) Identification of management opportunities within state law recommendation of an action plan to identify strategies for maintaining the trout fishery including water temperature, water quality and structural habitat;

ISSUES OF CONCERN

Fish Consumption Advisory

Fish advisory consumptions are of concern in the St. Louis River. Although the quality of fish caught in Minnesota is among the highest in the Great Lakes Region, chemicals such as mercury, polychlorinated biphenyls (PCB's), and dioxin have been found in some fish in certain waters. The levels of these contaminants are usually low and in Minnesota and there are no known cases of illness that have been

caused by people consuming fish from state waters. The Minnesota Department of Health have established guidelines for how often fish can be safely eaten. Overall fish consumption advisories in the St. Louis River Basin are generally more restrictive downstream of the City of Cloquet. Fish consumption advisories are published by the Minnesota Department of Health.

Threatened and endangered species and critical habitat

The northern forests of Minnesota include several state and federally listed species of endangers plants and animals. Many of these occur within the St. Louis River system. Threatened, endangered or special concern species closely associated with the river include the timber wolf, pine marten, bald eagle, osprey, trumpeter swan, American bittern, wood turtle, Blanding's turtle, Lake sturgeon, marsh reed, eastern hemlock and moschatel. A list of threatened and endangered species that could occur in the St. Louis River Watershed is found in the Appendix. Where these species are known to occur, management activities should be evaluated and if necessary, the area placed into a Unique Protection Area.

There are some habitat components which provide critical food and cover for wildlife in the corridor. These habitats should be maintained or increased, if possible. They include:

1) Stands of oak, northern hardwoods, white pine and upland white cedar.

2) Forest openings of upland grass, upland brush and berry patches.

3) Marshy, open water wetlands of cattail, bulrush or wild rice.

4) Deer winter yards.

5) Heron rookeries.

6) Super-canopy trees for eagle/osprey nest sites, especially white pine.

7) Wood turtle habitat (sand/gravel stream banks).

8) Fish spawning sites.

9) Cold water streams, springs and seeps.

10) Large diameter trees, especially conifers, that overhang the rivers to provide shade, snags, and woody debris.

11) Mixed coniferous/deciduous forests.

Wood Turtle Management

The wood turtle is listed as endangered or threatened in Minnesota, Iowa and Wisconsin. Biologists from the U.S. Forest Service in cooperation with the Minnesota Department of Natural Resources have studied the wood turtle within the St. Louis River Watershed to determine why this species is uncommon in the Western Great Lakes region. The research, which focused on the turtle's movement, habitat use, nesting behavior and success, included an intensive population study on the Cloquet River and an extensive survey of the St. Louis River. The researchers concluded that several factors are contributing to the limited abundance of wood turtles in northern Minnesota including lack of nesting habitat, low reproductive success, and loss of immature wood turtles to natural causes.

Management of the wood turtle will take a partnership of private and public entities to effectively protect and enhance the species. Specific management guidelines for the wood turtle include:

1. Protect large sandy points from development and use.

2. Protect cutbanks, which are prime nesting areas for wood turtles, by making sure that all stream bank restoration programs and erosion control projects with reaches along the river likely to contain wood turtle nesting habitat are reviewed by the DNR Nongame Wildlife Program.

3. Enforce restrictions on recreational use of known wood turtle Nongame Wildlife Program.

4. Enforce restrictions on recreational use of known wood turtle nesting areas, especially along state designated Canoe Routes, between May 1 and June 20 when turtles nest.

Exotic Species

Several exotic species are found in the St. Louis River and its tributaries. In the Cloquet River below Island Lake and in Fish Lake, the spiny waterflea has invaded. In the lower St. Louis River, the river ruffe is becoming a dominant fish species and could

adversely impact the native fish species. The zebra mussel is another exotic species that has been found, but it is not thriving in the river. As the potential exists for these exotic species to degrade the aquatic ecosystem balance in the upper St. Louis River system, the Minnesota department of Natural Resources and the St. Louis River Board should work cooperatively with other agencies to prevent the spread of these exotic species.

Future Planning and Review Activity

!The St. Louis River Board will review the recommendations made by the Forest Management Review Committee on forest management plans.

!The St. Louis River Board will cooperate with other agencies in addressing forestry, fish and wildlife issues of concern in the rivers' systems including fish consumption advisories, threatened and endangered species, and exotic species.

RECREATION

Recreation has always been one of the most common uses of the St. Louis, Cloquet, and Whiteface Rivers. In general, the recreational opportunities along the rivers are as varied as the rivers themselves, accommodating both the casual visitor to the area and the long-time resident who seeks a constant challenge in his or her outdoor experience.

The St. Louis River itself supports the highest density of recreational activity along its southernmost third where there are five canoe campsites, five boat accesses, hiking trails, historic sites, Jay Cooke State Park. The St. Louis River is also a designated Canoe and Boating Route which authorizes the Minnesota Department of Natural resources to develop and acquire recreational sites along the river. In fact, there are nationally significant rafting and kayaking tours and races along the lower reaches of the St. Louis River near Carlton. farther upstream, the river's rugged character and undeveloped nature makes for outstanding canoeing. Five carry-in canoe accesses and seven campsites exist on the banks of the St. Louis River upstream of Floodwood alone. Near the river's headwaters, within the Superior National Forest, the Norway Point recreational area provides an excellent place to launch a boat, carry in a canoe or have a picnic in the wilderness of Northeastern Minnesota.

The Cloquet River also is a DNR designated Canoe and Boating Route and has its share of visitors seeking the unique recreational opportunities available in Northeastern Minnesota. Several portages and whitewater offer challenges for experienced, as well as novice canoeists. Places with colorful names such as "Dry Foot Brown's Portage" and "Dirty Nose Campsite" add a historical touch to the river experience. The Cloquet River is divided by the Island Lake Reservoir into roughly equal length segments. The areas around the reservoir itself and downstream to its confluence with the St. Louis River are popular vacation spots with many private cabins and campgrounds available in the area. Farther north, however, the river is largely remote in character. The entire length of the northern section of the river can be explored by canoe with carry-in water accesses available from the river's headwaters at Cloquet Lake to the northern end of the Island Lake Reservoir.

The lease accessible of the three rivers is the Whiteface. Flowing through sparsely populated areas, the river has limited recreational

access, with a single boat access on the Whiteface Reservoir. The river's headwaters flow are in undeveloped public lands.

The people within the St. Louis River watershed communities have come to expect and enjoy a variety of recreational activities for every season.

Spring's release of melted snow and rain brings out whitewater kayakers, canoeists, and rafters.

Recreational uses in late spring and summer include fishing for brown trout, brook trout, catfish, walleye, smallmouth bass, northern pike, and a variety of other fish on all three rivers. Fishing can be done from boat, canoe, or even from shore at the many traditional fishing spots at the mouths of the tributaries. The Reservoirs also provide local residents with excellent fishing opportunities below the dams.

Day canoe trips offer fishing, swimming, and excellent opportunities to observe the region's wildlife in its natural habitat. Overnight trips add the fun and challenge of riverbank.
Later, in the fall, hunters take to the woods.

Winter brings snowmobiling, dog sledding, snowshoeing, river cross-country skiing, cold-weather camping, and rabbit hunting along the rivers' varied lowlands.

There are also visitors and tourists who come specifically to take advantage of the recreational opportunities in the area. Recognizing the importance of the tourism industry and the importance of maintaining the existing natural state of the rivers, recreational activities should be regulated to ensure protection of the rivers.

Future Planning and Review Activity

The St. Louis River Board will address the following issues and initiate an appropriate public process to determine:

a) A recreational management plan for campsite, access, and portage acquisition and development. This plan will be prepared by the DNR and the River Board within the next four years so that present and future recreational experiences along the river are protected. This plan would examine and address, but not be limited to, water surface regulations such as noise level, vehicle speed and enforcement.

b) An examination of existing and bygone boat launches, fishing areas and other accesses to determine an appropriate level of access while avoiding damage to the riparian environment.

c) The production of a guide highlighting various areas of historical interest along the rivers. This guide would include both Native American and historical elements with great care taken to highlight only those places which can be enjoyed in a non-destructive manner. It is generally felt that such an item would enhance the recreational appeal of the area.

For Your Information

-A complete study of recreational opportunities is available in Addendum A.

-For recreational development standards, see the Land Use Section of this plan.

WATER QUALITY

The St. Louis River watershed encompasses some 3,600 square miles and it is the largest watershed on the Lake Superior Basin within the United States. The St. Louis River Management Plan provides a vital opportunity to protect and enhance the water quality of the St. Louis, Cloquet, and Whiteface Rivers.

The water quality of these rivers and trout streams will be protected and enhanced by implementing the improved land use management requirements contained within this plan. An important charge of this planning process was to address land use practices that affect water quality and determine improvements needed to protect and enhance water quality. The objectives for water quality, the description of water quality parameters, conditions, and concerns, and the recommended solutions to water quality problems are presented to fulfill the overall goal of protecting and enhancing the water quality of the St. Louis River, its tributaries, and Lake Superior.

Objectives for Water Quality

Objectives for water quality in the St. Louis, Whiteface and Cloquet Rivers are as follows:

1) To preserve, protect and improve the existing surface and ground water quality and improve the water quality where needed in the corridor area. The St. Louis River Board must work together with local industry, recreation groups, the public and private sectors, local government agencies and the tourist industry.

2) To monitor and protect in stream flows and headwater reservoir levels.

3) To promote the establishment of a water quality monitoring network and information management system in partnership with all government units, resource agencies and public groups.

4) To identify and recommend remediation of point and non-point pollution of distinct ecosystems and habitats in the corridor.

Water Quality Conditions and Concerns

The water quality of the upper reaches of the St. Louis River and its tributaries is generally good for most general water quality parameters. The predominant portion of the St. Louis River watershed is forested with some agricultural and urban areas. These areas affect water quality by the potential for increased erosion and runoff and concurrent sedimentation and nutrient loading of the rivers. The implementation of the regulations, guidelines, and zoning standards within the Forestry, Fish and Wildlife and Land Use sections of this plan will fulfill some of the water quality objectives.

The water quality of the lower reaches of the St. Louis River has improved in recent years; however, concerns about some water quality parameters remain. The dissolved oxygen, biological oxygen demand (BOD), odor, and some contaminant levels have improved since the connection of the Western Lake Superior Sanitary District (WLSSD) to Cloquet. Sewage treatment improvements and mine tailing reclamation on the upper river has also contributed to improved water quality. The present concerns about water quality center mainly around the continuing problem of toxic contaminants which concentrate in the food chain. The Minnesota Department of Health issues annual Fish Consumption Advisories which give recommended consumption levels for fish in the St. Louis River. The two contaminants of concern on the River are mercury and PCBs. Mercury contamination is derived principally from on going deposition and runoff of mercury from airborne sources and from contaminated sediments in the lower St. Louis and its reservoirs. The PCBs contamination continues to affect fish from these lower reaches. Recommendations for improved riparian zone management will help keep mercury found in the watershed soils from entering the rivers and the food chain. Improved coordination between agencies and various groups and support for implementation of the St. Louis River Remedial Action Plan (RAP) will help solve some of the ongoing contamination occurring in the lower river.

The following discussion on general water quality parameters and concerns is included to inform and assist the public and managers in

protecting and enhancing the water quality of this important resource.

General Introduction to Water Quality Parameters

Dissolved Oxygen (DO)

Many water dwelling creatures require oxygen that is dissolved in water. Waters of consistently high dissolved oxygen (DO) are usually considered healthy and stable aquatic ecosystems capable of supporting many different kinds of aquatic organisms. Fact flowing water, as it rushes over rocks and plunges over hundreds of tiny falls, is aerated by the bubbles of air in the froth. Most of the dissolved oxygen in water comes from the atmosphere. Plants can also add oxygen to the water during daylight as a by-product of photosynthesis; however, they also deplete it as they respire at night, and require even more as they decay. When dissolved oxygen levels drop, insects that are sensitive to low levels of dissolved oxygen are reduced (mayfly and stonefly nymphs, caddisfly and beetle larvae) and more tolerant species become more numerous (worms and fly larvae).

The amount of dissolved oxygen in the water is dependent on three variables: (1) water temperature; (2) the amount of oxygen taken out of the water by respiration and decomposition of organic matter; and (3) the amount of oxygen replaced by physical aeration and photosynthesis. Decomposition and thermal impacts are important factors in reducing dissolved oxygen levels. The rate of decomposition varies depending on the amount of respiration and decomposition of plants and organic wastes such as sewage, agriculture and urban runoff. Thermal impacts may be generated by dams, lack of trees on banks and industries which use water for cooling.

The percent saturation of dissolved oxygen is determined by pairing the temperature of the water with the dissolved oxygen value (mg./1). Rivers with a constant 90 percent dissolved oxygen saturation are considered healthy. Areas of interest for dissolved oxygen in the st. Louis River include, above and below the Fond du Lac, Thompson, and Cloquet (Knife Falls) Dams, as well as the harbor estuary, areas which do not receive the same amount of aeration as fast flowing waters.

Biochemical Oxygen Demand (BOD)

Biochemical Oxygen demand (BOD) is a measure of the quantity of oxygen used by microorganisms in the aerobic oxidation of organic matter. Organic matter is fed upon by aerobic bacteria which require oxygen. In this process the organic matter is broken down and oxidized. Decaying aquatic plants and their decomposers demand oxygen. Nutrient input to the river (from nitrates and phosphates) will stimulate plant growth and these nutrients can lead to high biochemical oxygen demand by increasing the amount of organic matter.

Percent saturation of dissolved oxygen in waters with abundant plant growth and decay could potentially fall below 90 percent. Natural sources of organic material include organic matter entering rivers from swamps, bogs, and from vegetation located along the river banks (leaf fall). There are also human sources of organic matter which can come from point sources such as pulp and paper mills, food processing industries and wastewater treatment plants and from non-point sources including urban and agricultural runoff. Areas with low dissolved oxygen levels, due to high biochemical oxygen demand, will have organisms that are tolerant of low dissolved oxygen levels (carp, midge larvae and worms). Such areas will have fewer species because of the die off of species which require higher dissolved oxygen levels.

Temperature

Water temperature is an important measurement because the physical, biological, and chemical characteristics of a river are directly affected by it. For example, temperature affects the amount of oxygen that can be dissolved in water (gases are more easily dissolved in cold water), the rate of photosynthesis by algae and larger aquatic plants, the metabolic rates of aquatic organisms, and the sensitivity of some organisms to toxic wastes, parasites, and diseases.

Humans can change the temperature of natural bodies of water in several manners. thermal pollution refers to water entering a river which has a higher temperature than the river water. Industries that use water for cooling purposes and then discharge that water into the river can create thermal pollution. In addition, runoff from hot streets and sidewalks can cause thermal pollution. Water temperature is also impacted by river bank development and the removal of trees. Soil erosion is another factor for water temperature due to increased amounts of suspended solids which makes the water turbid and therefore absorbs the sun's rays and warms the water. When water temperature increases, so does the rate of photosynthesis and plant growth. as plants die, they are decomposed by bacteria which require

oxygen. Subsequently, when rate of photosynthesis is increase, the need for oxygen in the water is also increased. The metabolic rate of organisms increases with warmer water temperature and an increased metabolism increases the oxygen demand of organisms.

Life cycles of aquatic insects tend to speed up under warmer water temperatures and this can be a problem for migrating birds who depend on those emerging insects as a specific time. Most plant life and warm water fish (bass, crappie, bluegill, carp) live in water at about 68 degrees Fahrenheit. At temperatures less than 68 degrees Fahrenheit mayfly nymphs, caddisfly larvae, water beetles and water striders are common. Below 55 degrees Fahrenheit, some plant life will be found along with trout, salmon, stonefly nymphs, caddisfly larvae and mayfly nymphs.

Fecal Coliform

Fecal coliform bacteria are found in the feces of humans and other warm blooded animals. These bacteria can enter the river directly from animals, agricultural and storm runoff carrying animal wastes, and from sewage discharge into the water. Fecal coliform bacteria naturally occur in the human digestive tract and aids in the digestion of food and alone are not pathogenic. If fecal coliform counts are high (over 200 colonies / 100 ml of water), then there is a high correlation that pathogenic organisms are also present.

Diseases and illness such as typhoid fever, hepatitis, gastroenteritis, dysentery and ear infections can be contracted in waters with high fecal coliform counts. Activities such as swimming (full body contact with water) can occur only in water with 200 colonies / 100 ml or less. Boating (partial body contact with water) is safe in water with 1000 colonies/ml. Treated sewage effluent strives for 200 colonies / 100 ml in discharge.

pH

Water contains both H+ (hydrogen) ions and OH- (hydroxyl) ions. The pH test measures the H+ ion concentration and more H+ ions lower the pH value. The pH scale ranges from 0 to 14 with 7 being neutral, less than 7 being acidic, and greater than 7 considered basic. Because pH values are logarithmic, each decrease in pH unit indicates a ten fold increase in acidity.

The pH affects the solubility of many nutritive and toxic chemicals in the water and thus their availability to river creatures. Human acidification can occur from pulp mill effluent and from air

deposition due to automobile exhaust and coal fired power plant emissions. These acids combine with moisture in the atmosphere and fall to earth as acid raid or snow. Spring is a sensitive time for changes in water pH, for as the spring snow melts it flushes acidic water into rivers. Most fish will not live in water that has a pH of 5.5 and will die when the pH drops to 5.0 or less.

Total phosphate

Total phosphate refers to both organic phosphate and inorganic phosphate. Organic phosphate is attached to organic matter composed of once living plants and animals. Inorganic phosphates include ions which are bonded to soil particles and the phosphate found in laundry detergents. Phosphorus is an essential element for life; it is a plant nutrient required for growth (and a growth-limiting factor due to its low levels in nature) and a fundamental element in the metabolic reactions of plants and animals. The scarcity of phosphorus in the aquatic environment is due to its attraction for organic matter and to soil particles. Any unattached or "free" phosphorus in the form of inorganic phosphates is readily taken up by algae and larger aquatic plants. Because algae only require small amounts of phosphate, excess amounts can cause extensive algal growth called "algae blooms". Algal blooms are a result of cultural eutrophication, an enrichment of the water usually from phosphates and as a result of human activity.

Phosphate comes from several activities: human, animal, and industrial wastes; human disturbance of land and vegetation; runoff of lawn fertilizer; and wetland drainage which releases the phosphate that was contained in organic deposits. The first symptom of cultural eutrophication is an algal bloom that colors the water green. As eutrophication increases, the algal blooms become more frequent. Water in advanced stages of cultural eutrophication can become anaerobic and can produce gases like hydrogen sulfide which produce a "rotten egg" smell.

Changes in organisms living in a eutrophic situation are similar to the shifts found with other changes in water quality. The diversity in the aquatic community is decreased to those organisms that can survive with low dissolved oxygen levels. Total phosphorus concentrations of non-polluted waters are usually less than 0.1 mg./1.

Nitrates

Nitrogen is an essential nutrient required by all living plants and animals for building protein. Nitrogen is most abundant in its molecular form (N2) and makes up 78 percent of the air which we breathe. In this molecular form, nitrogen is useless for most aquatic plant growth. However, blue-green algae (the primary algae associated with algal blooms) are able to utilize the molecular form of nitrogen and biologically convert it to usable forms of nitrogen (ammonia -NH3 and nitrates -NO-3). For aquatic organisms to utilize nitrogen, they must eat plants and convert the plant protein to specific animal proteins, or eat other aquatic organisms which feed upon plants. Through the decomposition of dead plants and animals and excretions of living animals, nitrogen which was previously "locked-up" is now released. Because nitrogen (as ammonia and nitrates) acts as a plant nutrient it also can cause eutrophication. Nitrogen is not as limiting to plant growth (unlike phosphate), so plants are not as sensitive to increased ammonia and nitrate levels.

Sources of nitrates which may affect the St. Louis River include: runoff that overflows storm drains, runoff that contains lawn or crop fertilizers, runoff that contains farm animal wastes (potentially in the Meadowlands area), and poorly functioning septic systems (potentially in the Fond du Lac area).

Turbidity

The turbidity of the water is an indication of sedimentation or suspended solids. Sediment-laden runoff, whether from overland flow or bank erosion, muddies receiving waters and then turbidity in the form of suspended solid matter increases. As turbidity increases, light penetration decreases, making objects less visible at greater depths. Turbidity, simply stated, is the relative clarity of the water. At high levels of turbidity, water looses its ability to support a diversity of organisms. The water becomes warmer as suspended particles absorb heat from sunlight and warm water contains less dissolved oxygen than cold water. In addition, less light penetration decreases photosynthesis which in turn reduces oxygen concentrations. Suspended solids may clog fish gills, reduce growth rates and decrease resistance to disease, as well as prevent egg and larval development. Particles of silt, clay or organic matter can accumulate and smother fish eggs and aquatic insects resting on the river bottom. This material also fills in the spaces between rocks making these microhabitats unsuitable for mayfly nymphs, stonefly nymphs, caddisfly larvae and other aquatic insects living there. In addition, high levels of suspended solids ultimately increases the need for dredging in order to maintain navigation channels in the St. Louis River harbor.

Total Solids

This measurement includes dissolved solids (for example, materials in the water that will pass through a filter) and suspended solids (material which is retained by a filter). Dissolved materials include calcium bicarbonate, nitrates, phosphates, iron, sulfur and other ions found in water. A constant level of these materials is essential for the maintenance of aquatic life because many dissolved ions such as nitrates, phosphates and sulfates are building blocks of molecules necessary for life. Suspended solids include silt and clay particles from soil runoff, plankton, industrial wastes and sewage.

Outside sources that can affect the natural balance of total solids include urban runoff containing salt from streets in winter or fertilizers from residential and agricultural use (composed mainly of phosphates and nitrates). Sources that can affect the level of suspended solids are leaves and other plant materials which are broken down into particles of organic matter, suspended sediments (clay particles) from urban runoff and soil erosion, and decayed plant and animal matter (converted to particulate matter).

Benthic Macroinvertebrate Monitoring

Biological monitoring techniques are intuitive, simple and accurate and provide a method for assessing water quality. Macroinvertebrates are relatively easy to sample, they are continuous biomonitors, and they are a critical part of the food web.

Monitoring for macroinvertebrates is a fun, hands on and inexpensive approach to water quality monitoring. Benthic macroinvertebrates are aquatic organisms, visible to the eye, that live on the bottom of streams, rivers, and lakes. Some examples of these organisms include: crayfish, snails, clams, worms, leeches, and aquatic insect larva such as stoneflies, mayflies, caddis flies, and dragonflies. Many of these organisms are sensitive to water quality changes and are known as biomonitors of water quality. The composition of the macroinvertebrate community can provide information on overall water quality; the effects of nutrient and organic enrichment from both point and non-point sources of pollution; the effects of toxic contamination from point and non-point sources; and the differences in physical habitat conditions caused by changes in flow, riparian vegetation, and other human alterations.

Macroinvertebrate surveys can be used to determine the impact of human alterations on the river by documenting the differences in the community above and below the source of impact, or they can be used

to establish base line biological data of the presence and range of the communities found along the river. To date, there has been no comprehensive survey of macroinvertebrates conducted in the St. Louis River, and River Watch proposes to contribute such information to the scientific knowledge of this river.

Issues of Concern

Mercury

The mercury found in the St. Louis River comes predominantly from airborne sources and also from contaminated sediments in the lower River and reservoirs. Increased airborne sources come mainly from coal burning, ore smelting, waste incineration, and fungicides in paint. Efforts to reduce these sources are being made. The concern regarding mercury contamination on the St. Louis River involves reducing the amount of mercury runoff from the corridor and determining the best means to stop the on-going uptake of mercury from the contaminated sediments in the lower River.

Sediment Loading

Streambank erosion is the main source of sediment impacting the St. Louis River system. The rates of streambank erosion have been accelerated above naturally occurring levels by land use changes in the watershed. Sedimentation resulting from streambank erosion causes:

-damage and degradation of fish and wildlife habitat
-reduction of downstream reservoir capacity.
-increasing need for dredging to maintain Duluth/Superior shipping canals.

Toxic sediments from past industrial discharges have made disposal of dredge spoil difficult and costly. Eroding soil particles act as vehicles to transport toxics throughout the St. Louis Bay into Lake Superior. Uncontrolled development on sensitive streambanks will cause erosion and resulting sedimentation problems to get worse. Further acceleration of streambank erosion can be prevented by control of lot density and shoreland disturbances. Additional sources of sediment include eroding roadside and farm field ditches, construction sites, improper logging practices, and improper livestock grazing. The Soil and Water Conservation Service can provide Agricultural Best Management Practices and conservation programs that will help control erosion and protect sensitive areas.

Phosphorus levels

Phosphorus levels are high in the St. Louis River system. Point sources are being identified and treated. Non-point sources are more difficult to identify and treat. Runoff from animal feedlots and manure storage areas is a major non-point source of phosphorus. Fifty cows produce the nutrient equivalent of eight hundred people. Elevated phosphorus causes algae blooms, oxygen depletion and fish kills. The Soil and Water Conservation Service scan provide Best Management Practices and conservation programs that will help reduce phosphorus levels from non-point sources.

Leachate

In both the northern and southern reaches of the St. Louis River, there continues to be leachate from taconite tailings ponds and industrial landfills. Some of these sites have seeps that leak into the St. Louis River system. The leachate can contain a number of toxic and carcinogenic elements. Efforts to correct these problems will continue until there is no leachate entering the river.

The Minnesota Pollution Control Agency (MPCA) continues to monitor many of these sites. In addition, the St. Louis River Remedial Pollution Prevention & Control work group makes recommendations to the MPCA and the U.S. Environmental Pollution Agency (EPA).

Chemical Spills and Pipeline Safety

Several chemical spills in the past few years in the St. Louis River watershed have caused concern because of the potentially hazardous materials that could harm the rivers' aquatic ecosystems. Another point of concern are the crude oil pipelines which may cause spills into the rivers. A recommendation from the Citizen Advisory Committee is to build earth berms where the lines cross the streams and tributaries.

Future Planning and Review Activity

!The St. Louis River Board will continue to coordinate between agencies and various groups to help solve some of the ongoing issues of concern occurring in the rivers.

!The St. Louis River Board will help develop baseline studies of the water quality of the St. Louis River system by establishing two permanent water quality monitoring stations.

ARCHEOLOGY/HISTORY

Cultural History of the Area

The St. Louis River and its major tributaries, the Cloquet, and Whiteface, have been main arteries of travel for thousands of years. They have connected people with needed resources in the lands they drain: quarries for stone, plants for food and medicinal uses, fish and animals for meat and products such as furs, trees for homes and for export. The St. Louis watershed continues to nurture both Native American peoples and more recent immigrants from abroad.

The record of human interaction with the St. Louis is documented in the places used, modified, and built by people. These places, or cultural properties, not only supplement the written and oral record for recent history, but are the primary source of information about the early occupation of the St. Louis.

Nature and Types of Cultural Properties

A wide range of types of cultural resources reflect the diversity of our history and culture. These resources are sometimes called heritage resources or cultural resources, and in various laws they are sometimes called cultural or historic "properties". They include buildings, structures, archaeological sites, cemeteries, landscapes, and individual objects which represent significant aspects of our heritage. These resources may range from 50-year old family cemeteries to 10,000-year old campsites with fire hearths and stone artifacts. These records of the human use of the St. Louis river area are nonrenewable because they are specific to the cultures and times which created them. These cultural properties are tangible connections to our past.

Most cultural resource sites are very fragile and can be seriously affected by activities such as timber harvest, road construction, bank stabilization, and recreation facility construction. Any earth-disturbing activity can uncover, move, or destroy artifacts and the soils which make up a site.

Identification of a property as "cultural" or "historic" does not automatically mean that it must be preserved or cannot be modified. decisions about which properties to preserve as links with our past are made within a legal framework by designated agencies and individuals.

There are a variety of ways to categorize heritage sites, depending on information needs. The categories applied here are designed to assist the land manager in making decisions about the potential effects of activities on sites.

Each group of heritage resources shares certain characteristics that affect their scientific value, the effort needed to locate them, and their vulnerability to damage from management activities.

There are four major groups of cultural resource properties as follows in addition cemeteries:

Cultural Landscapes. These are a collection of features which represent interaction between humans and the environment. People may assign cultural meaning to natural features or features which have been made or modified by humans. For example, a river might have been extensively modified for log driving. Or people may ascribe important cultural meanings to particular plans, rocks, or geographic features. Maple Island, in the St. Louis River above Thomson, is one example of a Cultural Landscape from the St. Louis River inventory. This island is a locally recognized geographical landmark, but it also was considered sacred by Chippewa (Ojibway) people.

Standing Structures. These include buildings and structures made and used by people, generally in the recent past. These may range from houses and logging camps to bridges. Some bridges over the rivers may be important for their history, and some standing structures in towns along the rivers may also be significant. Standing structures may also be associated with buried artifacts and soil anomalies created by the people who constructed and used the structure. These deposits would be considered archeological sites.

Archeological Sites. These sites are located on or below the surface of the ground. They include remains of Native American villages, camps, and processing sites (such as ricing or fishing sites), and Euroamerican fur trade posts, homesteads, and logging camps where above-ground structures may no longer present. Most of these sites are not visible at the ground surface and require special techniques to locate.

Traditional Use Sites. These are locations which have been historically used by one or more groups of people for some type of activity. They may lack the physical evidence of artifacts or structures, and are often characterized by plants, animals and/or topography which are of cultural and spiritual significance to Native

Americans. These sites range from areas where particular religions practices are carried out, to areas where ceremonial/medicinal plants and traditional economic plants are gathered. Traditional Use sites may also be Cultural Landscapes.

Heritage Context

To understand how a property fits into our history, we need to understand how it is associated with a particular time, landscape, culture, and events. Each site within the above categories can be placed within an historic "context". The State Historic Preservation Office has defined a system of statewide contexts which are used to assist in determining if a site is significant. These contexts are divided into two major types: broad patterns which can be applied statewide, which are called "Broad Historic Contexts"; and specific subjects which are called "Thematic contexts" (SHPO 1991). The following overview follows this general system of organization (SHPO 1991, 1993), and compiles information from various other overviews (Caine and Goltz 1993, Harrison 1985, Mulholland 19, Peters and Motivans 1985, Anderson n.d.).

The SHPO Broad Historic Contexts are divided into three time periods: Precontact Period (9,500 B.C. - A.D. 1650), Contact Period (1650-1837), and Post contact Period.

PRECONTACT PERIOD

PALEOINDIAN TRADITION (ca.10,000 B.C. - 6,000 B.C.)

The Paleoindian Tradition is the oldest cultural manifestation in the Precontact Period. Northeastern Minnesota was glaciated until approximately 10,000 B.C. when glacial ice had wasted sufficiently to offer vegetation and animals which supported human populations. Other, unglaciated, areas of North American had been previously colonized by hunting peoples, who now began to move into the area.

The people who lived in the region during this time occupied a landscape and climate which differed greatly from today's. In general, during the earlier part of the period, the climate was cold and damp, with vegetation similar to the taiga of the far north. People relied heavily on the hunting of large game animals, probably moose and herds of caribou.

Few sites from this time are known only because populations were probably small and created few habitat sites. River routes and lake

shores have changed as the hydrological patterns of the landscape have matured. Finding early sites generally requires sub-surface testing and the modeling of probable past landscapes to determine which areas were most likely to have been used in the past.

In Northeastern Minnesota, most known sites from this period date to the most recent part of the period. During this time, the climate gradually became warmer and drier, and pine and birch began replaced the previous spruce dominated forest. These sites are characterized by the presence of diagnostic artifacts such as long lancelot-shaped stone points. Variations of two types of these Plano points seem to be most common in the area: Agate Basin, and Scottsbluff styles.

Local materials were used extensively. In particular, Knife Lake siltstone and jasper taconite, along with Gunflint cilia seem to have been the preferred materials.

The most extensive analysis of artifacts from this period is based on the Redepenning collection (Harrison et al, in preparation). This collection, from Island Lake Reservoir, contains Paleoindian artifacts as well as more recent Archaic artifacts. The only excavated site among the numerous sites in the Reservoir lakes area is the Fish Lake site (Steinbring and Whelan 1971). Peters also suggests that the presence of Holcombe points, which are eastern variants of Clovis, indicates a greater time depth than previously thought, and demonstrates the distinctiveness of the Paleo manifestation in the Great Lakes area.

ARCHAIC (ca.6000 B.C. - 300 B.C.)

The archaic is marked by changes in diagnostic stone tools which appear to be a response to major climatic changes which required new patterns of resource procurement. The era was markedly warmer and drier and is sometimes referred to as the "Altithermal".

People still based their livelihoods on hunting, but appear to have added fish as an important staple, as well as increasing their use of a wider variety of other animals such as muskrat and beaver. Their economy appears to be more diversified, and probably involved the development of a season round designed to exploit different environmental niches.

Recent work by Gordon Peters of the Superior National Forest suggests an emerging pattern of site location involving both riparian and lacustrine sites which may have been occupied at different times of

the year (Peters, personal communication). Favored site locations included narrows on lakes and rivers.

Projectile point types shifted to various stemmed and notched styles. Ground stone tools and copper artifacts were added to the tool kit. Locally available copper was worked into spear points, knives, awls, woodworking tools such as wedges, and fishing equipment such as gaffs. Stone choppers, gouges, large utilized flakes, large end-scrapers, and knives/preforms are common. Once again, the preferred materials are mainly locally available and include the heavy use of siltstones and an increasing preference for cherts.

No undisturbed sites from this period have ever been excavated in Northeastern Minnesota. Except where sites may be exposed due to erosion, such as in reservoirs, sub-surface testing based on geomorphological modeling is needed to locate occupations from this period.

WOODLAND (CA 300 b.c. - European Contact)

The initial shift to the Woodland Tradition is characterized by the addition of ceramic vessels and the construction of burial mounds. In Northeastern Minnesota, this shift is represented by the Laurel culture. The pottery produced by these people was distinctive in shape, surface treatment and decoration. Laurel pottery is conoidal, often with very pointed bases, has smoothed surfaces, and is decorated around the top and,in some cases, partially down the sides, with encircling impressed decorations such as punctuates, stamping, and incising.

Laurel people built imposing burial mounds at major river junctions in northern Minnesota. Few mounds are known from the St. Louis watershed, however, indicating that large burial sites, such as those along the Rainy River, may have served Laurel people from a wide area.

There was an increasing use of aquatic resources during this period, and wild rice probably became a regular part of the diet. Beaver, fish, turtle, and large game animals such as moose were important.

Projectile points are corner-notched and stemmed, gradually changing toward more triangular types through time. Copper continued to be used. There appears to be an increase in small tools which were probably used in working wood and fiber materials (Peters and Motivans 1985).

The Laurel culture is succeeded sometime after circa 800 A.D. by the Blackduck culture. Whether the Laurel culture simply changed and evolved through time into the Blackduck culture or whether these are new people settling the area is unknown. Blackduck pottery differs strikingly from Laurel pottery. It has a rounded, globular shape, marked neck construction, and fabric or cord marked impressions on the surface. New decorative techniques come into use, particularly corded impressions, and the extensive use of punctates.

The typical projectile point used by the Blackduck and later peoples is a small side-notched or unnotched triangle, which was probably used on an arrow shaft. Use of the bow and arrow in the area seems to begin at about this time. Locally available cherts are the preferred material, and the use of jasper taconite and silt stones is nearly non-existent. Although copper is still used, its prevalence also declines markedly. Bone tools were important: barbed harpoons are common on fishing sites in north-central Minnesota, for example, and awls and needles were also fashioned of bone.

Burial in earthen mounds continues, but Blackduck people frequently made use of mounds previously built by the people of the Laurel culture.

Fish and wild rice are clearly important components of the Blackduck diet.

Blackduck sites are common in areas where there were, or are, wild rice stands. During the period immediately before contact with Europeans,other pottery types are found in Northern Minnesota and adjacent areas. These types, labeled Sandy Lake and Selkirk by archaeologists, are distinct from Blackduck pottery, but whether they represent new peoples in the area is unknown. Current hypotheses equate Blackduck with Algonquin speakers Sandy Lake with an intrusion of Siouan speakers into the area.

CONTACT PERIOD

The exact date of first contact between Europeans and Native Americans in Northeastern Minnesota is unknown. The effects of contact further to the east were felt in the area prior to the actual arrival of many Europeans. The Algonquin speaking Ojibway who had once lived further east began pushing westward with the development of the fur trade. This affected other groups, such as the Cree to the north, and the Sioux and Assiniboin to their south.

The first mention of what later came to be known as the St. Louis River is found on a Jesuit map of 1670. The area where the river entered at the head of the Great Lakes was known as Fond du Lac or the "head of the Lake". The first European to clearly leave a record of a visit to Fond du Lac was Daniel Greysolon, Sieur du Lhut (Duluth). With the development of the fur trade, he returned in 1680 to arrange a peace among the competing tribes in the area so that the trade could continue. Although it is apparent that sporadic war broke out, particularly between the Ojibway and the Sioux, little other archival documentation is available about the area until the mid 1700's. In 1767 Alexander Henry sent a clerk to Fond du Lac to open up trade with the Ojibway. In that same year, Jonathan Carver recorded that 12 Ojibway families were camped at Fond du Lac.

The Northwest Company entered into partnership with Astor's American Fur Company, under the name Southwest Company, and was in operation at Fond du Lac in 1816. During Lord Selkirk's War with the Northwest Company, the Fond du Lac post, including personnel and goods, was seized by Selkirk's men. Astor's American Fur Company then bought out the Northwest Company interest and operated the Fond du lac post from 1817 to 1842. By then, the fur trade had diminished greatly in importance.

Other independent traders and trappers lived in the St. Louis watershed throughout this period. Routes for transportation of furs to market were established which utilized all of the major tributaries of the St. Louis. Numerous canoe and portage routes are known for this period. Major transportation routes included the St. Louis to Savanna Portage, and the St. Louis-Embarrass-Eshquagama-Pike River portage. Trade goods and furs were transported by canoe and overland trail, and many of these trails later were improved for use by ox-cart and horse.

Areas which have high potential for leaving a record of this time period include both ends of portages, and terraces at river or lake junctions. Most of these will be along today's shorelines.

The SHPO Property Type Documentation, "Portage Trails in Minnesota 1630s-1870s" provides a context for evaluating these types of sites. The Savanna Portage which is part of the St. Louis to Sandy Lake route, the Height of Land portage which connects the St. Louis and Rainy River drainages, and the Grand Portage of the St. Louis, are all on the National Register of Historic Places.

As the fur trade waned, scouting teams sent out by lumber concerns began to survey the area. Logging of white pine began even before

any treaty settlements with the Native American groups in the area, and raised strong objections from Native leaders. The first land session west of the St. Croix River was signed in 1837, and marked the beginning of intensive logging in what is now Minnesota. Logging began first in east central Minnesota along the St. Croix and its tributaries. By the late 1800s, this area had been logged over, and the industry moved northward. Dozens of logging companies were operating within the present Superior National Forest between 1880 and 1940. Sites associated with this logging activity come under the context, "Northern Minnesota Lumbering, 1870-1930s" (SHPO Statewide Contexts).

Waterways formed the earliest transportation routes for moving logs to market. Both small and large sawmills were developed in the St. Louis watershed, streams were dammed to control water flow, and literally hundreds of logging camps existed. As pine close to water routes was logged off, operations moved inland. Combined with the increasing emphasis on hardwood cutting, railroads and tote roads became necessary for getting the logs out. Traces of these extensive transportation routes can still be seen today. Some routes involved major engineering feats, such as the trestles and bridges bringing railway service over the gorges of the St. Louis River.

Many of the sites relating to this era can be located by first examining the archival data. The location of many others was never specifically noted in any documents and many of the earliest documents, such as those listing land claims, are unreliable. Most of these sites have surface indications, such as berms and depressions, and can be located by aerial photo interpretation coupled with ground-truthing. because of the location of camps and transportation features was dependent more on the location of timber and land claims rather than any permanent features, sites may be located almost anywhere on the landscape. For example, temporary winter camps might be located in low-lying areas because they were clear of vegetation, but today they look most unpromising for occupation.

Treaties with the Lake Superior Ojibway bands opened up the area for Euroamerican mineral and timber extraction, as well as settlement, and forced Native Americans onto reservations. The Treaty of 1854 designated reservations within or adjacent to the St. Louis watershed at Fond du Lac near Cloquet, Grand Portage near Lake Superior and the Pigeon River, Nett Lake near Orr, and Vermilion near Tower. This system dispersed some groups of people and aggregated others with Ojibway people from other parts of Minnesota. For example, some Ojibway from the St. Louis River went to White Earth Reservation and

some to Fond du Lac. People originally living in the upper reaches of the watershed along the Reservoir Lakes moved to Nett Lake, Vermilion, or Grand Portage.

Although for some years after the treaty signing, most Ojibway continued their traditional way of life which called for seasonal changes in residence in order to follow the availability of resources, the government continued to pressure the people to settle on the designated reservations. As the fur-trade economy of the area declined, the Ojibway became a labor force for white logging operations.

The Old Fond du Lac Village, along with St. Louis River above Cloquet, is a site which is an example of changed settlement pattern forced by the United States Government during this time. Indian agents established an agency, school, churches, and tried to aggregate Ojibway families on the reservation. Old Fond du Lac Village existed from about 1860 until 1914, when a change in government policy essentially closed the village and forced Ojibway people to live on their allotments. Sites dating from this era fall under the context, "Indian Communities and Reservations 1837-1934" (SHPO Statewide Contexts).

The first land surveys in the St. Louis watershed date from the 1850's, but most Euroamerican settlement dates from the 1800's, and is concentrated in villages which originated with the lumber industry. Thomson, established in 1870, is a good example. It initiated with river logging and then expanded along the Lake Superior and Mississippi Railroad, the first railroad through the area. The primary industries were the A.M. Miller Sawmill which operated from 1872 -1891 and the St. Louis Slate and Brick Company. After the sawmill closed, the town quickly lost population. When the Thomson dam was built (1904 - 1907), it inundated part of the original village. The power company then built a small village at Forbay for its employees at the power plant site.

Most of the major population centers in the St. Louis watershed follow a similar pattern of establishment during the intensive logging era, expansion to support sawmills, and decline in population after the forest fires of 1918. Some of the larger centers continued to support logging-related industries such as paper mills which could utilize second-growth timber.

The development of hydroelectric power led to the building of larger reservoirs which undated some earlier sites of the homesteading and logging era. The sites and features constructed as part of this

development are evaluated for significance under the SHPO's Property Type Documentation "Hydroelectric Power in Minnesota, 1880 - 1940".

Although many Americans held hope that the St. Louis River area would yield valuable minerals, commercial deposits have not been discovered. Mineral exploration for copper, gold, and silver as for iron, has occurred, but few have any sites or significant features associated with them.

Some stone quarrying was done on the lower reaches of the St. Louis River. These quarries furnished "brown-stone" for a number of buildings in Duluth, and would fall under the thematic context, "Quarries and Mines" (SHPO Statewide Contexts).

After the decline of logging, tourism began to be important to the economy of the area, particularly in sections which contain lakes. The development of lodges, resorts and support industries such as motels and gas stations fits within the context, "Minnesota Tourism and Recreation in the Lakes Regions 1870 - 1945" (SHPO Statewide Contexts).

For Your Information

This past section has provided a concise perspective of the past history and cultural significance of various portions of the St. Louis river system. There are also laws and regulations pertaining to the protection of cultural resources. Two of these laws are:

Private Cemeteries Act (Minnesota Statutes 307.08)
-This Act protects all burials, including the burial mound, regardless of ethnic origin, on all public and private lands and waters in Minnesota.

Archeological Resources Protection Act of 1979 (16 U.S.C.470, Public law 96-95)
-This act protects archeological sites on Federal lands.

Future Planning and Review Activity

Although this section has provided a general background to the archeology and history of the St. Louis River area, it is only the beginning of the process to understand and address the cultural history of the area.

To adequately address the cultural history, the St. Louis River Board in the future will consolidate and summarize the inventory efforts, conduct additional inventory work, and identify a variety of management options for sites of cultural history.

Appendix

JOINT POWERS AGREEMENT

COOPERATIVE PLANNING MANAGEMENT AGREEMENT BETWEEN THE FOND DU LAC RESERVATION

ST. LOUIS RIVER BOARD ORGANIZATIONAL STRUCTURE

ST. LOUIS RIVER BOARD MEMBERSHIP

TABLES

1. FISH SPECIES
2. STREAMS MANAGED FOR TROUT
3. ANIMAL SPECIES
4. MAMMALS
5. BIRD SPECIES
6. AMPHIBIANS AND REPTILES
7. RIPARIAN AND LOWLAND FOREST ASSOCIATES
8. NON-RIPARIAN AND LOWLAND FOREST PLANTS
9. COMMON TREES AND SHRUBS
10. AQUATIC PLANTS

Joint Powers Agreement

Cooperative Planning Management Agreement
Between the Fond Du Lac Reservation

St. Louis River Board Organizational Structure

Table 1
Fish Species

Table 2 & 3
Trout Streams
Animal Species

Table 4 & 5
Mammals/Bird Species

Table 5/6
Bird Species/Amphibians & Reptiles

Table 7/8
Riparian & Lowland Forest Associates
Non-Riparian & Lowland Forest Plants

Tables 9/10
Common Trees & Shrubs/Aquatic Plants

Glossary

Accessory Structure or Facility is any building or improvement subordinate to a principal use which, because of the nature of its use, can reasonably be located at or greater than normal structure setbacks.

Allowed means to permit as in acceptable.

Alteration activities are efforts which modify the land into something different.

Aquacultural use is the use and management of land for production or raising of fish. This use shall include all needed structures and facilities and maintenance.

Archeological or historical site is an area of land where material remains (as fossils, relics, artifacts, and monuments) of past human life and activities are present.

Berm is an earthen mound used to direct the flow of runoff or spillage around or through a BMP.

Best Management Practices (BMP) are a way of making management decisions that will prevent or reduce non point pollution by the most effective, economically, and technically practical means.

Biological Oxygen Demand (BOD) is the quantity of oxygen consumed during the biochemical oxidation of matter over a specified period of time.

Bluff is a topographic feature such as a hill, cliff, or embankment having all of the characteristics:

a. part or all of the feature is located in a shoreland area;
b. the slope rises at least 25 feet above the ordinary high water mark of the River;
c. the grade of the slope from the toe of a bluff to a point 25 feet or more above the ordinary high water mark averages 30 percent or greater; and
d. the slope must drain toward the River.

Bluff impact zone is determined by the vertical distance from the ordinary high water level (OHWL) inland to a point where the slope levels to 6% over a 100 foot run. The vertical height from the

ordinary high water level to the start of the 6% slope shall be measured, and that height shall be multiplied by three and add 30. This area shall serve as the bluff impact zone.

Boathouse is a structure designed and used solely for the storage of boats or boating equipment.

Borings are cylindrical samples of a soil profile used to determine soil conditions.

Borrow pit is a land use involving the excavation or digging material for use as a fill at another site. Borrow pits used for the private use of a land owner and pits used to construct roads for forest management purposes shall not be considered borrow pits. Pits used for public roads and other work purposes shall be considered borrow pits.

Building is any structure for the shelter, support or enclosure of persons, animals, chattels, or property of any kind.

Building line is a line parallel to a lot line or the ordinary high water mark at the required setback beyond which a structure may not extend.

Campground is an area accessible by vehicle and containing campsites or camping spurs of tent and trailer camping.

Campsite is usually a DNR designated place suitable for or used as the site of a camp.

Clear-cut is the removal of trees, shrubs, or undergrowth.

Commercial planned unit developments are uses that typically provide transient, short-term lodging spaces, rooms, or parcels and their operations are essentially service-oriented. For example, hotel/motel accommodations, resorts, recreational vehicle and camping parks, and other primarily service-oriented activities are commercial planned unit developments.

Commercial use is the principal use of and or buildings for the sale, lease, rental, or trade of products, goods, and services.

Commissioner is the Commissioner of the Minnesota Department of Natural Resources.

Commodity production is a product produced as a result of efforts in agriculture, mining or timber industry for profit.

Conditional use is a land use or development as defined by ordinance that would not be appropriate generally but may be allowed with appropriate restrictions as provided by official controls upon a finding that certain conditions as detailed in the zoning ordinance exist, the use or development conforms to the comprehensive land use plan of the community, and the use is compatible with the existing neighborhood.

Culvert is a conduit through which surface water can flow under roads.

Deck is a horizontal, non-enclosed platform with or without attached railings, seats, trellises, or other features, attached or functionally related to a principal use or site and at any point extending more than three feet above ground.

DNR is the Department of Natural Resources.

Dwelling site is a designated location for residential use by one or more persons using temporary or movable shelter, including camping and recreational vehicle sites.

Dwelling unit is any structure or portion of a structure, or other shelter designed as short-or-long term living quarters for one or more persons, including rental or timeshare accommodations such as motel, hotel, and resort rooms and cabins.

Erosion is the wearing away of the land surface by running water, wind, ice, or other geological agent.

Eutrophication is the process of over-enrichment of waters by nutrients, often typified by the presence of algal blooms.

Extractive use is the use of land for surface or subsurface removal of sand, gravel, rock, industrial minerals, other non-metallic minerals, and peat not regulated under Minnesota Statutes, sections 93.44 to 93.51.

Fecal coliform bacteria are minute living organisms associated with human or animal feces that are used as an indirect indicator of the presence of other disease-causing bacteria.

Feedlot is a lot or building, or combination of lots and buildings intended for the confined feeding, breeding, raising or holding or animals and specifically designed as a confinement area in which manure may accumulate, or where the concentration of animals is such that a vegetative cover cannot be maintained within the enclosure. Feedlots are regulated by the number of animal units where 1000 pounds is equal to one animal unit.

Felling is the process of severing trees from stumps.

Filter strip is an area of land adjacent to a water body which acts to trap and filter out suspended sediment before entering surface waters.

Floodplain is for any given flood event, that area of land adjoining a continuous watercourse which has been covered temporarily by water.

Forestry is the management, including growing and harvesting of a forest, woodland or plantation, including the construction, alteration or maintenance of woods roads and landings and the related research and educational activities.

Harvesting is the felling, loading, and transportation of forest products, roundwood or logs.

Groundwater is water located below the water table in an unconfined aquifer or located in a confined aquifer.

Impervious area are impermeable surfaces, such as pavement or rooftops, which prevent the infiltration of water into the soil.

Impoundments are structures which collect or confine the water.

Industrial mineral exploration is exploratory drilling of minerals for industrial use.

Industrial use is the use of land or buildings for the production, manufacture, warehousing, storage, or transfer of goods, products, commodities, or other wholesale items.

Intensive vegetative clearing is the highly concentrated removal of plants, trees, and shrubs in an area.

Landing is the place where trees and logs are gathered in or near the forest for further transport.

Lot is a parcel of land designated by plat, metes and bounds, registered land survey, auditors plot, or other accepted means and separated from other parcels or portions by said description for the purpose of sale, lease or separation.

Lot coverage is the percentage of lot surface encumbered by impervious surfaces including but not limited to, structures, paved parking lots, sidewalks, etc.

Lot frontage shall be the minimum distance between the points of intersection of the side lots and the ordinary high water level.

Lot width is the shortest distance between lot lines measured at the midpoint of the building line.

Nonconformity is any legal use, structure or parcel of land already in existence, recorded, or authorized before the adoption of official controls or amendments thereto that would not have been permitted to become established under the terms of the official controls as now written, if the official controls had been in effect prior to the date it was established, recorded or authorized.

Non point pollution is the pollution whose source can not be pinpointed; the source of this type of pollution are thought to be a series of many small sources or sources spread out across the landscape such as agricultural pollution.

Ordinary high water level is the boundary of public waters and wetlands, and shall be an elevation delineating the highest water level which has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For watercourses, the ordinary high water level is the elevation of the top of the bank of the channel. For reservoirs and flowages, the ordinary high water level is the operating elevation of the normal summer pool.

Performance standards are conditions which must be met before something is accomplished or allowed.

Permitted use is a use that is specifically allowed in a zone district without the requirement of a conditional use permit.

Person is a firm, association, organization, partnership, trust, company, or corporation as well as an individual.

Planned unit development is multiple residential or commercial dwelling units including but not limited to townhomes, condominiums, motels, hotels, resorts and related commercial activities.

Planning commission is a group of citizens appointed by the local legislative body whose responsibility it is to carry on planning activities, with the help of a professional staff or consultants, including the development and recommendation of a zoning ordinance. The commission also hears requests for rezoning or amendments to an existing ordinance, makes recommendations to the local legislative body, and may have the authority to issue conditional use permits.

Prohibited means forbid by authority.

Public works are works constructed for public use or enjoyment especially when financed and owned by the government.

Resource Management System is a combination of conservation practices and management measures identified that, when installed, will permit sustained resource use by the Quality Criteria established in the USDA Soil Conservation Service Field Office Technical Guide, for treatment of identified soil, water, air, plant and animal resource concerns.

Residential planned unit development is a use where the nature of residency is non-transient and the major or primary focus of the development is not service-oriented. For example, residential apartments, manufactured home parks, time-share condominiums, townhouses, cooperative, and full fee ownership residences would be considered as residential planned unit developments.

Riparian zone or area is the relatively narrow strip of land that borders a stream or river, often coincides with the maximum water surface elevation of the 100-year storm.

Riprap is a layer of boulders or rock placed over the soil to protect it from the erosive forces of flowing water.

River classification area or corridor is the amount of land that is regulated by this management plan as detailed in the land use section.

Road is an open way for vehicles, persons, and animals.

Road authority is the party who builds and maintains the road.

Rural industry is employment or pursuits in a county setting.

Scarification is the process of removing the forest floor or mixing it with the mineral soil by mechanical action preparatory to natural or direct seeding or planting of tree seedlings.

Sedimentation is the process or manner in which dissolved inorganic or organic material comes to rest on the earth's surface after being transported by water.

Setback is the minimum horizontal distance between a structure, sewage treatment system or other facility and the ordinary high water mark, road centerline, road right-of-way line, front, side, or rear lot lines.

Sewage treatment system is a septic tank and soil absorption system or other individual or cluster type sewage treatment system.

Sewer system is pipelines or conduits, pumping stations, and force main, and all other construction, devices, appliances, or appurtenances used for conducting sewage or industrial waste or other wastes to a point of ultimate disposal.

Shore impact zone is land located between the ordinary high water mark of a public water and a line parallel to it at a setback of 50 percent of the structure setback.

Shoreland is land located within the following distances from public waters: 1,000 feet from the ordinary high water mark of a lake, pond, or flowage; and 300 feet from a river or stream, or the landward extent of a floodplain designated by ordinance on a river or stream, whichever is greater. The limits of shorelands may be reduced whenever the waters involved are bounded by topographic divides which

extend landward from the waters for lesser distances and when approved by the Commissioner of the Department of Natural Resources.

Site is an area evaluated as to its capacity to produce a particular forest or other vegetation based on the combination of biological, climatic and soil factors present. Site expresses the capacity of a given area to grow timber or other vegetation.

Skidding is the act of removing trees from the site of felling to a loading area or landing by tractor, horses, or specialized logging equipment.

State Shoreland Standards are the minimum regulations and criteria that apply to shorelands of the public waters of the State of Minnesota which are subject to local units of government land use controls.

Steep slope is land where agricultural activity or development is either not recommended or described as poorly suited due to slope steepness and the site's soil characteristics, as mapped and described in available county soil surveys or other technical reports, unless appropriate design and construction techniques and farming practices are used in accordance with the provisions of this ordinance. Where specific information is not available, steep slopes are lands having average slopes over 12 percent, as measured over horizontal distances of 50 feet or more, that are not bluffs.

Structural setback line is a line measured across the width of a lot at a point where a structure is placed in accordance with the minimum setback requirements of this ordinance. Structure is any building or appurtenance, such as decks, but excludes aerial or underground utility lines such as sewer, electric, telephone, telegraph, gas lines, towers, poles, and other supporting facilities.

Subdivision is land that is divided for the purpose of sale, rent, or lease, including planned unit developments.

Top of bank is that point where the slope levels to six percent over a 100 foot run.

Variance is the same as defined or described in Minnesota Statutes, Chapter 394 (for counties) or Chapter 462 (for municipalities).

Water-oriented accessory structure or facility is a small above ground building or other improvement (except stairways, fences,

docks, and retaining walls) which, because of the relationship of its use to a surface water feature, reasonably needs to be located closer to public waters than the normal structure setback. Examples of such structures and facilities include boathouses, gazebos, screen houses, fish houses, pump houses, and detached decks.

Wetlands are defined by Minnesota Statutes which presently means lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. Wetlands must have the following characteristics; have a predominance of hydric soils and are inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions.

EFFECTUATION

This ordinance shall take effect and be in full force on the 5th day of April, 1994, upon its adoption by the St. Louis County Board of Commissioners and its publication in the official newspaper(s) of St. Louis County as provided by Minnesota Statutes.

Public hearings were held by the St. Louis County Planning Commission on October 18, 1993, and March 10, 1994, and by the St. Louis County Board of Commissioners on February 22, 1994, and April 5, 1994.

Commissioner _____ moved the adoption of this ordinance, and Commissioner _____ duly seconded the motion, and the ordinance was adopted on the following vote:

Yeas:

Nays:

Absent:

_____
Liz Prebich
Chair of County Board

Certified as a complete and accurate copy of Ordinance No. 27, Article II, Section 21

_____
Gordon McFaul
County Auditor

Attest:

Karen Erickson
Clerk of the County Board